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by L. Ron Hubbard

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INTERPLANETARY BALLOONS

There will, of course, be many stages in the development of interplanetary ships. In the predictable future, certain engineering factors can be calculated; in the unpredictable future, those factors will be rendered meaningless, and that makes that time-area a field for the wish-fulfillment type of prophecy. Someday, undoubtedly, man will learn how to cut off gravity; someday he will learn to harness his engines directly to the fabric of force-strains that constitutes the physicist's "space"—since the ether is discarded—and propel ships efficiently. But those stages are not in the engineering-predictable future.

At present, ships will be rocket-driven jobs, fighting gravity all the way. And certain engineering concepts can be applied to such ships that lead to some interesting propositions.

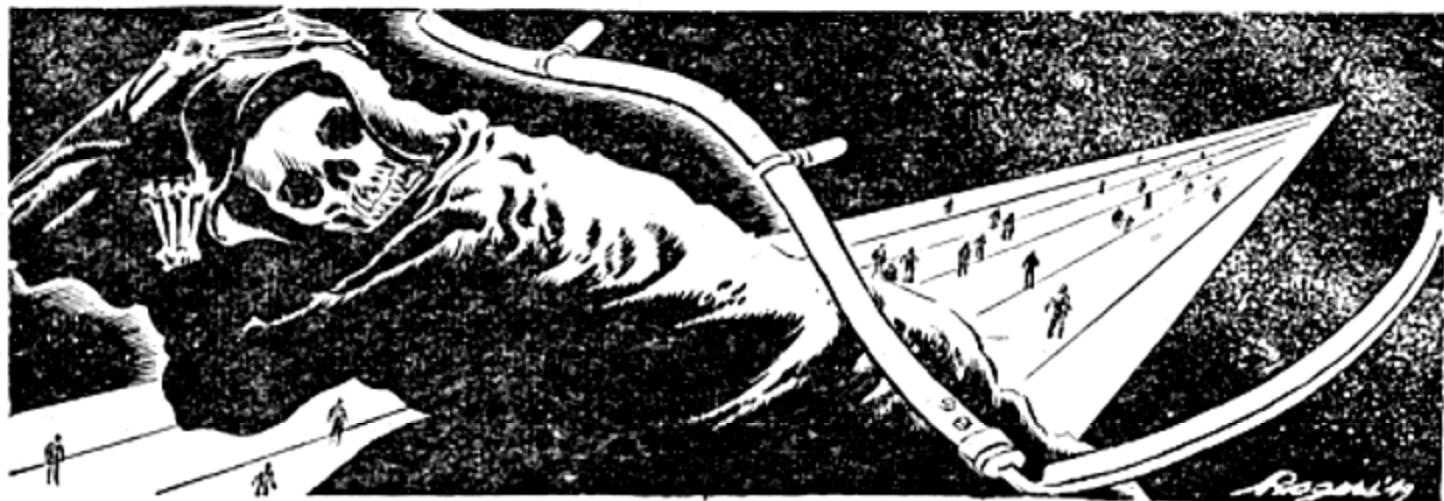
First, a rocketship, when taking

off from Earth, is fighting three separate, distinct factors: its own inertia, Earth's gravity, and atmospheric friction. A rocketship capable of only 1-G acceleration could, with a thousand tons of fuel, float a foot off the take-off base, and stay there till the fuel was exhausted—all used up merely fighting Earth's surface gravity. The faster a rocketship gets going, gets out of the Earth's heavy surface-gravity field, the more of its fuel is used accelerating the ship, and the less is used fighting gravity.

But too-great speed at take-off means excessive loss of energy to air friction—so we have to compromise on a moderate speed until the thicker air layers are passed.

Also, while fuel-efficiency would make it desirable to start off with perhaps a 15-G take-off, there are contradictory factors. The fuel *would* be more efficiently employed in over-

(Continued on page 162)



TO THE STARS

BY L. RON HUBBARD

First of two parts. The first full story of the men who ride the ships of the Long Way—the interstellar trips through space—AND TIME!

Illustrated by Rogers

Space is deep, Man is small and Time is his relentless enemy.

In an ancient and forgotten age, he first discovered the barricade. Before space travel first began he knew the barricade was there. It was an equation. Without that equation, the basic equation of mass and time, Man could not have progressed beyond barbaric fire. But he did progress and he used fission and his mechanicians became mighty and his hopes large. But the terms of his salvation were the terms of his imprisonment as well.

TO THE STARS

AS MASS APPROACHES INFINITY, TIME APPROACHES ZERO.

Two mathematicians derived the equations first—Lorentz and Fitzgerald. And a theoretical philosopher, Albert Einstein, showed its application. But if Lorentz and Fitzgerald and Einstein gave Man his Solar System they almost denied to him the stars.

And yet, despite the difficulty derived by these great men and confirmed first by nuclear physicists and then by actual use, there were still

those who accepted and yet defied the law, a small cohort of ships and men who, throughout the ages have kept the routes alive. The outcasts and pariahs of extra-atmosphere travel, the cursed and shunned by Man, they coursed their lonely ways, far-bound but prisoners too, shackled fast by Time.

Knowing well their waiting fate, who would volunteer to become part of that thin group, knowing well their fate?

But amongst the societies of man there are always those who are outcasts from character or force of circumstance and there are adventurers who will not heed equations. And so the stars were reached and partially explored despite the fate of those who made the runs.

They called it the long passage, though it was not long—to the ship or its crew. It was only long to Earth. For those who approached the speed of light also approached the zero of time. At various high speeds the time differential upset men's lives. For they who lived weeks on the long passage left Earth and the Solar System to gather years in their absences.

The economic value of the long passage was small. A six-week cruise to Alpha Centauri—which had very little to give, unlike the further stars—brought back a crew to an Earth aged many years. Star commerce was not a venture of finance, it was only for the "benefit" of the crew.

Intersystem vessels could be

geared to the high drive. And sometimes when port authorities waited with arrest, a liner would slip away from the gravity of the Sun and would lose itself to the stars. Or a criminal would steal a vessel in the hope of eclipsing years. But the results were the same.

He who is gone for a century cannot well return. He knows too little. His people are dead. He has no place and he does not fit. And what may have begun as an adventure for a crew invariably ended in the same way—another passage out while behind them further age accumulated while the crew stayed young.

The only fraternity was within the ship.

The only hope was that some day someone might discover another equation, a solution to the barricade:

AS MASS APPROACHES
THE SPEED OF LIGHT, TIME
APPROACHES ZERO.

The outcasts of the long passage, those that stayed alive, never ceased to hope.

I.

Alan Corday stopped, momentarily blinded by the flash of a Mars-bound liner getting free from Earth. For an instant the skeletal racks had flashed red against the ink of sky and the one used now pulsated as it cooled. Corday did not like to be blinded here in this place, even for a moment. He wiped a tired hand against his blouse, carefully reassuring himself that his papers and wallet were still in place.

To the north glowed New Chicago, a broad humming city hiding beneath its five stages its hungry, its sick and its uncared for lame. Civilization was mushroomed up from a mire; the columns were pretty, the fountains in the rich gardens played in many hues, cafes winked their invitations to the rich and under it all was the beggar's whine, a shrill, lost note but steady enough to some day bring these towers down in wreck.

To an engineer-surveyor of the tenth class, New Chicago was a grave in which he could bury all his years of school and field work for a pittance and eventually wander out of this life as poor as he had entered it. To an engineer tenth people were polite because of his education and breeding and distant because a man in need of a job must be poor.

He had heard vaguely that the new duke of Mars was employing men in public works and he knew certainly that an engineer tenth would be a rarity in that newness. But it took money to get to Mars unless one could work his way and Alan Corday had need to save his money.

In five years, her father had said, she could marry him providing he had enough to start his own offices. Chica had wept a bit and he had tried to cheer her.

"They say there's work on Mars and that the new duke has an open hand. Don't cry, it won't be very long. I'll go for two years and two years will soon pass. Don't cry, honey. Please don't."

But two years would be long

enough and five years were unthinkable. If his father had not seen fit to die a bankrupt— But it wasn't his father's fault. It was his own for dawdling his time away on special courses.

"Two years and I'll be home again, I swear it. Here, look at me. Have I ever broken my word to you now? Have I? There. That's better. We'll make it yet—"

And he had painted a fine word picture for her of the house they'd have when he came back and how his purchased business would hum and he had left her cheered. But he was not so sure himself. Mars was an uncertain place to go at best even if the pay was high. And his going was even more uncertain now for he had asked four ships so far this night and not one of them would haul without cash.

"You're a queer bird," the last captain had said. "What's a swell doing with a passage-beg? Thought you engineers was rolling in it."

What use to explain bankruptcy to this gnarled spaceman? Even the tenth class could go broke—and could retain its class standing providing it did not beg.

"Sell a couple of polo ponies and go cabin," the old skipper had said. "What's the world comin' to with a tenth class askin' to swab decks? Adventure ain't all its cracked, sonny. You come for a lark. Go home and read a book."

Alan Corday felt the depth of the shadows now that the rocket after-

glow was gone. It wasn't healthy here on the flats. He rubbed his knuckles nervously. He did not mind fighting but he had a job to do.

All the rebuffs he had received made him feel like a fool. A tenth class without two thousand for a passage was conspicuous. He wished he had worn dungarees and that he had some time learned to lie. But a gentleman didn't lie and, broke or not, he was still a gentleman.

Lights flickered unevenly through the filter of a garbage strewn alley. He was getting down near the stews now, out of the officers neighborhood. He didn't have a gun and he was a fine target for a footpad in this white silk jacket. But he picked his way toward the lights.

A black cat leaped with a startled squall from his path, crossed it and vanished; Alan laughed nervously at the way the sudden noise had made his hand shake. Jumping from a cat!

Then he heard the first notes of the melody. Strange, eerie notes, haunting and terrible were being plucked from an ancient piano—slow music, simple and yet complex. One could expect many things on the flats he had been led to believe by a lurid press, but not a melody like that. Alan knew something of music but he had never heard such a thing before. The floating notes were like a magnet and without knowing that he had moved he found himself standing outside a cheap glass building looking intently at the door.

It was just a common stew. A drunk lay sprawled on the walk, the

side of his head covered with blood, a series of snores wheezing between his teeth. And over him floated the eerie song.

Alan stepped into the yellow light and thrust back the door. Because of its stillness he had expected to find the place empty of all but the player. But below a bluish haze which crawled twixt ceiling and floor a jammed mass of men sat hushed, their drinks arrested in their hands.

It was tribute, Alan thought, and certainly the music was of a quality to do this even amongst such a crew as this. But then he saw they were not listening. They were waiting and they were afraid.

Far across the reeking place sat the player, engrossed in his moving hands, oblivious of any audience. The piano was battered and chipped with blasts, three members of a string orchestra, almost equally misused crouched with the rest of the room, waiting and afraid. And the young man played.

He was a strange young man. In this bluish light his face looked too sharp, too white, too handsome. There were strange qualities mingled in that face, raptness uppermost now. A helmet and spaceman's gloves lay to hand on the piano top. A shirt and trousers, startlingly white, gave no clue to any age but certainly not to this. And about the young man's waist was a wide belt of gold metal from which hung a weapon Alan had never seen before. And the room waited, hushed.

The hands strayed for the final

notes and then hung in memory of the melody dying away now in the strings. Then the young man stood and Alan saw that he was not young. Gradually the reverie left his face, gradually other expressions began to combine in it. The man was nearing fifty and his eyes were hard. His mouth was cynical and his whole thin face was cruel. But he was handsome to the point of beauty, handsome and diamond hard.

The proprietor cringed up to him. "Your worship . . . may we serve again . . . the men—"

The man swept down a languid, cynical eye and then stepped from the musicians' platform. He knew what he had done to them. And he knew he had done it with music. His smile told that, if a smile it was.

"Bucko!" he said. And a burly, gray-haired man jumped eagerly up. "Have their cups full. Yes, and let them drink to the *Hound of Heaven*."

The gray-haired one spoke and the place shook and yet one could tell that he thought he spoke softly. "Fill up! Fill up and drink to Captain Jocelyn! Jocelyn and the *Hound of Heaven*. Ah, no you won't!" he hastily added, grabbing a spaceman who had sought to dive for the door. The spaceman turned, caught a blow on the mouth and crumpled into a chair. The burly one beamed at him.

"Fill up and drink!" shouted a blowsy girl.

"And who's this?" said the man who had played, looking with some-

thing like interest at Alan.

"Two more rounds!" said the burly one with an amiable roar, "and then we'll open the books for your names. Right ones or wrong ones, but by Jupe you better sign!"

Another spaceman tried to get away and a slip of a girl in a queen's finery tripped him before he could make it.

"Sit down," said the man who had played, seating himself carelessly near the entrance. "I'm Jocelyn."

"Alan Corday," said Alan guardedly extending a hand. But if Jocelyn saw it he ignored it.

"A tenth class by your jacket," said Jocelyn. "Drink?"

"Ah . . . no thank you. I—" he steadied himself with an inward rage. A space captain refusing the hand of a tenth class. And making the tenth class feel self-conscious and confused in the bargain.

"Are you going to Mars?" said Alan.

Jocelyn filled a two-ounce jigger and shoved it across the table. "Drink up."

Alan was on the verge of refusal. But there was something in Jocelyn's being which reached out and entangled Alan's will. Confused, he drank.

"Educated as what?" said Jocelyn.

"Engineer-surveyor," said Alan, reaching for his papers.

Jocelyn waved the offered sheaf aside. "Ever been in space?"

"Why no, but I feel I might—"

"How old are you?"

"Twenty-six."

"You're a child," said Jocelyn.

"And you are also a fool. What are you doing here on the flats at this hour? Kill somebody?"

"Sir, I—"

"Sit down!" said Jocelyn. "Answer me!"

"It's a private matter."

"Ah, a girl. You were indiscreet—"

"Confound your tongue!" said Alan hotly. "My father was bankrupted and I am going to Mars to serve the duke if I can. This is honorable enough, isn't it?"

"And when you've served two years," said Jocelyn.

"I'll come back and re-establish my firm and marry—" He stopped. He had not meant to bring her into this. And then, out of his own embarrassment he saw that Jocelyn had death in his eyes.

Struck without warning, Alan went down into the sawdust. He came up from the overturned chair, both hands snatching for Jocelyn's throat. And then two men had him from behind and there was a knife a quarter of an inch already into his ribs.

"Put him back," said Jocelyn. "You young fool. Drink this up and go home." And his hand shook as he poured the liquor and it spilled over to become a black pool on the ringed table.

But Alan would not be set free so easily and the men held fast. In a moment he felt the indignity of further struggle and stood straight. The

burly one was at-hand now beside Jocelyn.

"Hello!" he roared. "A tenth class! Or so I been told your collar tabs so mean. Well, you'll make a fine addition! A fine addition! Educated too, huh? What's he educated in, skipper?"

"Engineer-surveyor," said Jocelyn coldly. "But he's not going."

"Well, I'm blessed if I know what that is," said the burly one, "but it do sound like he might be taught one end of a celestolade from 'tother. Built nice, too. You'll like the *Flea Circus*, youngun."

"I said he wasn't going!" snapped Jocelyn.

"Shucks, skipper. You'n me, watch on watch while these logheads ride in comfort and security and here's a fine second mate—"

"I'll sign if you're going to Mars," said Alan.

Jocelyn looked at him in deep contempt.

"Mars, why sure. Sign to Mars. Gow-eater, take your slimy paws off that youngun and get the articles."

Jocelyn got up, swept the filled glass into his hand and drained it. He reached back of him as though he had eyes there and seized the unresisting girl who had earlier tripped the spaceman. He brought her close to him, deliberately forgetting Alan. But the girl was looking and her eyes were dreamy and veiled.

"Sign fifteen," said Jocelyn. "And hold the rest. We clear at midnight. Understood?"

"You bet your life," said the burly one.

Jocelyn pulled the girl out through the door and called at a cruising hack. "Some place they sell fancy clothes," Alan heard him say.

And he looked down and saw his name on the articles. "The *Hound of Heaven*. Outward Bound for Alpha Centauri, Betelgeuse and Other Ports of Call." He went white and lunged back. But Gow-eater and his friend still had him.

"Now, now," said the burly one, "you'll get to Mars some day."

"You can't hold me!" shouted Alan. "You can't do it! *You're on the long passage!*"

The burly one grinned. "I'm Bucko Hale, sonny. You wouldn't be here if you wasn't desperate. So why get desperate about the long passage? Who knows, ten or fifteen years we might even come back. That's Earth time. But you won't be much older. Now calm—"

"Let me go!" screamed Alan, half an inch of knife already trying to pin him to the wall. "Let me go!" And there was real frenzy in him now, knife or no knife. He knew all about the Lorentz-Einstein Relativity Equations. He knew what happened when a ship got to ninety-nine percent of the speed of light. And his girl—

Bucko Hale reached out and struck him, struck him expertly and well and the Gow-eater put a belt around his arms and body.

"No need to attrac' a patrol," said Bucko. "Now the rest of you boys

step up and sign and we'll have a merry time. Wine, women and billions, me boys and a nice, long look at history—"

II.

He knew many things but his condition was close to delirium and the things he knew merged with the things he feared until his mind was a seething maelstrom of nightmare.

Buckled down tight in a hard steel bunk he could see only shadows and the dim meshes of the springs overhead and these blurred into symbols and figures and spun.

The pages of Einstein's text fluttered in his head and the symbols of Einstein's work danced before his eyes. What he had once considered as a curious and rather interesting phenomenon he now saw in its ghastly truth.

Cold, dispassionate hand of science, how glibly it could write! "When the velocity of mass approaches one hundred eighty-six thousand miles per second, Time approaches zero; as mass approaches one hundred eighty-six thousand miles per second it approaches infinity." They had discovered that years and years ago and it had stood, the barricade to the long passage; and Alan saw it now with nightmare clarity. Time approaches zero, time approaches zero, time approaches zero.

Three weeks to Alpha Centauri at one hundred eighty thousand miles per second! "As mass approaches infinity, Time approaches zero for

the mass." Three weeks to Alpha Centauri *for the mass.*" For the mass!

"But Time is constant at finite speeds." At finite speeds! And that meant Earth. That meant New Chicago. And that meant the woman who might have become his wife.

The pages fluttered in his brain and the figures blurred in his sight and he quailed before it as had quailed the hardest and least sensitive of men. He was on the long passage with the outcasts and pariahs of space. And from the ache in his body he knew he was already split away from the clocks of Earth and on a deadly route of his own.

He knew little about these people of the long passage beyond an occasional account in a newspaper, beyond an occasional display in a museum, beyond a new bauble in a store. But his own ability to take care of himself with them he did not greatly doubt. Not yet. He was thinking of a girl and a promise and his heart gave a sick wrench within him.

She would wait. He knew she would wait for he had loved her long and since childhood he had been her guidon—

Something stuck him in the arm and he glanced, startled, to find a ruddy face, haloed with gray, close by him.

"Hello! Awake again? Now, now, calm down young fellow. They say you'll be second mate and I'm to take care of you. So steady as she goes and sheer off the asteroids, eh?"

Alan spoke thickly: "Go to the devil."

"Dare say we'll meet, but neither of us are in a hurry. The devil gets enough from Time-Zero." He laughed with delight at his own pleasantry and repeated it, "The devil gets his fill from Time-Zero." This cheered him so much that he had to skip backwards and turn a whirl. Then he peered very close and solemn at Alan. "I'm Dr. Strange. You weren't on dope or anything were you when you ran away?"

"I didn't run away! I'm here from no choice!"

"Don't want to kill you. Compound Theta Seven won't work on opium. Fights it. Kills the patient. Wanted to be sure. But you're to be second when you come around. Bad case. Hard to work."

The ship was completely silent with only a faint vibration in her. And the sound of footfalls rang clear as Jocelyn approached. He ignored Alan, looking instead at the berths across the room. Alan saw now that he was in a sick bay and that he was not alone. Fifteen others were strapped in their tiers.

Jocelyn surveyed the berths and gave a faint snort of contempt. "Shabby enough. But I need a phoneman for Second Con. Jar one up; be quick."

Strange altered his face quickly. He was anxious. "Aye, aye, skipper." And he snatched a needle from a kit held out to him by a child Alan had not seen before. This grave-

faced orderly was not more than eight; his hair was cropped, a clean streak showed around his mouth and his medical jacket got under his feet, having been meant for a man.

The doctor jabbed a spaceman in the opposite berth and the man began to toss.

Apologetically, the doctor said: "I can't guarantee his health, captain. I tried to work them over but some of them are tough. Resistant. This young man," and he indicated Alan, "won't trace at all. He merely raves—"

Jocelyn fixed a hard eye on Strange and his handsome face turned a little paler. "Then you were drunk yesterday."

"Me? Why, skipper—!"

"You *were* drunk," said Jocelyn, talking quieter as his anger rose. "I told you to leave his mind alone! What do I care what happens to these cattle. But you've got a trained brain there. Leave it alone! You fool, will you dabble with your confounded hypnosis—" He quieted himself with an effort. "Leave his mind alone, doctor. Psychiatry or no, there's much you have to learn about men."

Strange hastily began to excuse himself but Jocelyn cut him off.

"Unstrap him," said Jocelyn, pointing to the awakened spaceman.

The doctor quickly began on the buckles and Alan, like an animal in a trap ranged his eyes over the room for a means of escape. There was a door at either end and one in the side. But the one in the side was



JOC ELYN

marked "Emergency" and its handles plainly indicated that it was not lightly to be touched for they were massive wheels. Alan wondered if it were part of the damage control system which must exist on such a craft. He speculated that it might lead to a lifeboat compartment and if it did— Hope began to stir up in him.

The spaceman was also staring about. He was a blond youngster, marked with a rayburn across his forehead and marked as well with the pallor peculiar to space. He had been on the Venusian run for five years, comfortable if dangerous, ten thousand miles an hour, a week in port at either end. A trifle different from the long passage. And the hard desperation which had begun to set his face showed how well he knew it.

But he was cunning. He permitted himself to be steadied to his feet and then bent as if he would test his limbs after their confinement. But he came up with a powerful blow in each hand, striking Jocelyn a heavy back-hand blow in the chest and throwing the doctor aside like a sack. There was a blazing insanity in his face, caused half by drugs, half by his terror and even while Jocelyn staggered the spaceman lunged for the emergency port. Behind it there might be a lifeboat. Beyond it might lie freedom.

And his big hands wrenched at the locks and spun them open, one, two and three. His grip was resting on the fourth and last when the sick bay

resounded with the lash of an arc pistol.

Alan stared. The spaceman stood immobile for a breath and then his hands fell away from the last wheel. He stumbled back, drifting with the acceleration of the ship, clutched a stanchion and with a mild, apologetic look, crumpled to the floor, dead.

Jocelyn gathered himself up from the filthy deck. He was breathing heavily from the blow and the ionized, discolored air around his drawn weapon seemed to pulse as though he breathed out smoke.

He went to the door to close the locks. Air was seeping out of the compartment, sucked greedily by outer space.

He came back and holstered his gun.

"Get me another one up, doctor."

Gnomelike and nervous, Dr. Strange hung on the edges of bunks, now here, now there, needle ready, his thin voice sawing the silence while gravely near him stood the urchin with his jacket from chin to floor.

It was a process Alan was to find common and necessary on the long passage—psychotherapy. Brutal therapy. Nothing delicate about it. If you had to take a man's mind half away to make him useful on a ship, take it away. Crush his memories, rob his personality, stamp out his rebellion. There wasn't much time that could be spent, drugs were cheap and crewmen were dear. Narco-hypnosis was the most effective speed

tool. A vessel on the long passage was never full complement and a man made into an idiot, if he could steer, was better than a full personality with revolt in his heart.

Despite the captain's injunctions Alan twice awoke out of a groggy doze to find the red-faced doctor close by his ear. Once Alan got his arm free after many a cunning twist. He grabbed Strange by the throat and would have killed him if the man's needle had not been half full and close by.

"No hard feelings," said the doctor much later, coming back from a patient. "And you're in no danger from me." He laughed. "I'm curious about your society and age, about what a tenth class might be. And I thought you might have had a lecture or two on your modern psychiatry stashed away in your cranium. Got drunk and couldn't get a book this time. I'm very seldom drunk but once in a while when you come back and see things changed you want to drink." He underwent a change of expression and averted his eyes. But in a moment he was bouncing again and laughing.

"They're smarter now. But that's to be expected. They get smarter and smarter and learn new things. So you're safe. When I was a boy they had just invented the Weaver cellular exhaustion technique. I—What's the matter?"

Alan was looking at him in despair. "How old are you?"

The doctor shrugged. "Fifty-sixty ship-years. *Flea Circus* years. That's

ship slang. We call her the *Flea Circus*. We—"

"What year were you born?" demanded Alan.

The doctor sneered off. "Guess you better sleep now. Day or two the skipper will want—"

"The Weaver exhaustion technique is three thousand years or more old!" said Alan. "How old are you? Not ship-years! Earth-years! How old are you?"

The doctor cringed. But he was instantly himself. "But you don't need to worry about your wits. They've learned a lot and all I wanted was what you might know. I'm a very nosey fellow. But you won't talk and now I understand why and so you're safe enough Jocelyn or no. I'll have to tell him. They evidently proof a tenth class when they're born. There's no sentient period behind what proofing they gave you. You can't take an hypnotic suggestion and you won't reply. I'll have to tell Jocelyn. That will surprise him. Very, very interesting. What they must have intended you for with all the trouble they've taken on you. A tenth class—"

"Look," said Alan, "beyond basic lectures in social intercourse I was never trained in your field. I know nothing beyond the fact that all noble born children are proofed. I am an engineer by training, and building a bridge and breaking a mind are two different things. Leave me alone."

He turned his face to the scarred wall.

Outward bound on the long passage, outward bound to the stars. He did not know the speed of this pariah nor how close it would come to light. If it was as slow as ninety-four percent it still meant that for every moment ticked by the clocks of the *Hound of Heaven*, hundreds passed on Earth. *If the Hound spent six weeks in a round trip to Alpha Centauri, nine years would pass on Earth.*

"As mass approaches the speed of light, time approaches zero." It was his sentence. A cold equation, a dispassionate mathematics, but it was Alan Corday's sentence to forever.

The run to Alpha Centauri would be the shortest trip they could make.

How old would be his people when he saw them next? How old?

III.

A fourteen-year-old girl, nervous and frightened, eyes staring, sidled into the sick bay. She made two or three efforts to talk and then sang out with a rush:

"Cap'n's compliments and Corday's wanted on the bridge and he better make it snappy."

She gulped and subsided. Strange came up from his narrow white desk and hurriedly began to unlash his patient, talking cheerily the while.

"What's the course, Snoozer? You always have the latest? Whither bound? Or do I have to produce some candy?"

"Cap'n told me not to talk."

"How about a cognac bon-bon?" said Strange.

She gulped hard, her gaze fascinated by the doctor, standing first on one foot and then the other as she watched.

"Two cognac bon-bons," said Strange. "Snoozer's the captain's runner," he explained to Alan as he helped his charge sit up.

"Two?" faltered Snoozer, wiping a hand across her mouth.

Alan stood unsteadily. The girl was very pretty, would be more so if she ever washed her face or combed her hair.

Strange looked fixedly at Alan. "Now you'll be good, won't you?" And taking silence for an answer walked away to his desk to unlock a drawer. He pulled out a box of candy and was in the act of removing the cover when the girl managed a decision.

"No. You'll know soon enough," she said, looking forlornly at the bon-bons and suddenly conscious of a bruise on her wrist which she began to nurse. She let out a shuddering sigh and abandoned the offered box.

Making sure that Alan was following she darted back through the doorway, gave the bon-bons one last look of despair and then led off up a ladder.

Alan braced himself. For a long time now he had been running over what he meant to say to Jocelyn and the approaching interview quickened his breath and pace.

Running on ahead, the girl would

sometimes stop to make sure he was still coming. Alan was. But his eyes were searching as he went for lifeboats. He knew that a space life-boat could span back the short distance to Earth and he was sure that he could run one. But as he went, though he saw many things, he found no sign of an air lock berthing.

Such was his state of mind that few details registered with him. He was gazing on this vessel as a very temporary prison and he was little interested in her. Vaguely it came to him that she was a complicated ship, multi-decked, every inch of space used, and that she was manned by a very strange crew.

Those people he saw were off duty, for his course lay wholly within the berthing compartments and mess halls. What surprised him most were the number of children, for he saw some dozens of them playing on the decks or cradled in the berths. One woman looked at him curiously and said something to a dozing man in the next berth after he had passed.

In the mess hall some card games were in progress and one group was listening raptly to an old man who was telling them a tale. There were more women than men here and it was puzzling until one realized that half the company of the vessel was on duty elsewhere.

A companionway led upwards from the mess hall and here Snoozer halted again to wait. A scrawled sign over her head said, "Bridge Country".

Alan stopped for a moment to

gather his wits and suddenly felt a presence behind him. It was the gangling, pasty man that had held him in the dive, Gow-eater. And Alan knew that he had had a silent guard all the way.

"Let's go," said Gow-eater.

Alan mounted the ladder and found himself staring through a thick double port at the blackness of space and the blazing stars.

"In there," said Snoozer in a frightened whisper and Alan turned to an open door.

The chart room was ancient in design, having a globe for the plotting of courses and cases for the three-dimensional charts, a ledge for computation and two magnetic legged stools. Jocelyn, helmet pushed up and back, white shirt open at the throat, sat with a pair of compasses idly making holes in a pad.

A torrent of speech was ready on Alan's lips but Jocelyn began to talk without looking up, his presence effectually silencing the younger man.

"Mr. Corday, I've had you up to show you duty. Sit down on that stool and keep your mouth closed. You have a lot to learn."

Alan hesitated and then spoke angrily.

"Captain Jocelyn, you seem to have decided that I would do a lot of things. I do not intend to do them. You have taken me, without my consent into a rotten life. I dare say you consider yourself very well above the law. But let me promise you, before we go further, that the

first port into which we call will find me before the authorities bringing charges for kidnaping. I have no intention—”

Jocelyn looked up and his mouth curled. “You are a fool, Corday. Sit down.”

Alan stiffened. He was unaccustomed to scorn or contempt and the look and tone of the man drove his temper to a higher beat. On the table lay the captain's gun and belt, coiled amid pens and charts. A little whiter, Alan made as if to sit down and then with a swift strike snatched the butt of the gun.

Instantly the sharp pointed compasses came up and stabbed. They bore straight through muscle and bone and pinned Alan's hand to the chart board, points penetrating all the way through and a half an inch deep into the wood.

In the agony of it Alan struck with his free fist, wrenching at his imprisoned hand the while. Jocelyn deflected the blow and struck back. Alan reeled and slumped, held up only by the impaling compasses.

“Corday,” said Jocelyn, “you have a lot to learn.” But he looked different for a moment, his eyes probing hopefully into the slack face of the younger man. Then he wrenched out the compasses and reached over to boost Alan to the stool.

Sullenly Alan bound up his bleeding hand with a handkerchief. The gun butt still extended toward him and now and then his eyes flicked to it.

“You are young,” said Jocelyn.

“You've got a lot of romantic nonsense in you about the freedom of the individual. You're filled to the eyes with the importance of your own petty concerns. I have rescued you from something worse than this and I'm not paid. You are a fool. Self-conscious, quixotic, short on experience, crammed with undigested learning. I am doing you the honor of offering you a post of responsibility. My advice to you is that you accept.”

Alan glowered at him.

Jocelyn flung a hand at the untidy masses of charts. “You are an engineer of the tenth class. You have been eugenically selected for brains and trained to empire building. Probably your family lost its money—and I saw that they did not forgive that in your age. You need money. We are outward bound on a short cruise, a few weeks—”

“Do me the honor of not lying,” said Alan.

“You know something about this, then?”

“Too much.”

“Like you to assume you know a great deal when you don't. What have they taught you in school, the latest?”

“And why would you be interested in that?”

Jocelyn looked at him contemptuously. “Do you suppose, Mr. Corday, that I enjoy, that anyone on this ship enjoys the fate of the long passage? Do you think that we want this sentence to continue forever? Are you such a fool as to believe that peo-

ple in such ships as this have no hope of a country, a society, of belonging?

"What are we?" he cried in sudden rage. "Outcasts. Pariahs. We land and are gone a few weeks in our lives and we return to find that years have stripped away everything we have left. On a normal fifty light-year voyage, a century can pass on Earth. And what happens in a century, Mr. Corday? We age in weeks on the long passage. Earth and the Universe ages by decades. And who wants us? Who will be there when we return? What government? What technologies? We bring back wealth from the stars to the descendants of those who commissioned us. We speak archaic tongues more ancient on every trip. Our learning is nothing and in any society we would misfit and starve and we're outward bound again. Do you know what it is to be without a country, Mr. Corday? Without people? Without a home? Who cares what happens to us. We have this little hell of a ship. Not even another engaged on the long passage can be our friend. We are out of time, out of step. We are nothing!"

"Ponder if you want the joy of seeing the centuries crush and destroy whatever we leave behind us. It's an empty sight, Mr. Corday. We are hated and we do not belong."

He had stood up as he talked and his face was whiter with strain. He slumped back now and from the cabinet behind him took a bottle. He poured a brimming glass and into it poured a powder from a folded

paper. He drank without relish and set it back.

"Now what are the latest time equations, Mr. Corday?"

Alan was confused by this difference of character and overwhelmed by the graphic details of the fate which was now his. But he could enjoy the cruelty of what he had to say as revenge against what had been done to him.

"There are no new time equations, Captain Jocelyn."

There was a long silence and then Jocelyn, as though nothing had occurred, picked up a sheaf of chart changes and began to finger them.

"Mr. Corday, if you perform duty faithfully in the next three or four months, you will return to Earth with a large fortune. It is possible that less than fifty years Earth time will have elapsed. You are an educated man. There is much that is very antiquated aboard this ship and much that you can remedy with your newer technology. The *Hound of Heaven* is not a very old ship, less than sixty years ship-time. She was well designed for her period but that is two millenniums past. You are here, you cannot help it. I would advise you to make the best of your situation."

Alan looked bleakly at the black heavens and the blazing stars. He was stunned even though he had known. Half a century. Half a century. How old would his girl be then?

And she would wait.

Numbly he got up from the stool and fumbled his way down the ladder. He turned once and looked back. Captain Jocelyn was emptying a paper into a brimming drink.

IV.

He sat in the second mate's cabin giving an apathetic ear to the Deuce. On the desk before him spread the master plans of the vessel, much-chewed by cockroaches and dimmed with mold and overlaid time after time with smudged pencil marks showed a multiplicity of changes.

"Yer see," said the Deuce, "she's altered around somewhat every trip or two. That's yer penalty fer spannin' time so. Yer gets obsolete ever time yer hits port. An if yer lucky and the devils ain't terrin' Earth apart with er war or if yer ain't got a dictator or if yer just plain suffered in the docks yer gets some changes made."

He was a small man, an ideal spaceman from the standpoint of weight. His jaw bulged with tobacco and his eyes bulged with the concentration of speech. He swallowed the juice. His cap was a battered something with "Chief Engineer" in tarnished gold on it and his black dungarees carried the white, smudged lettering, "*Martian Girl*".

"So the old lady don't get any break to speak of," he continued. "Me, I'm really an instrument man and I guess I could fix anything if it was small, but I don't belong at what I'm doin'. Shortage of talent. So I

don't give her no break either. Burned her topside drives to cinders last trip through not knowing and had to work for two days in the ice-box. That's 'outside'. So deck force construction ain't tended to whatever and I guess there's a mort of gimmicks you could wrangle around and get right."

Alan looked dully at the plans. He was only half hearing what the Deuce was saying.

"Not that she ain't a bad hooker. Yer couldn't find er better one for the long passage. Her hull's a beauty. Shieldite. Solid. She come along about four-five hundred years after the first metal was poured together that would insulate gammas. And they went whole hog and no holds barred and by golly they built yer whole ship of it. Made her for the military it says there under yer thumb and they still got gun emplacements eround and they used to be a lot of signal lights strung up on her bows. Fancy. Admirals walked her bridge, they tell me.

"Then she went out to Alpha on a expedition. Tell me the guv'mint, whichever one it was, did things when she was a young ship. Anyway yer old baby was obsolete when she come back. She'd missed Alpha and her crew was half gone and the rest had mutinied. And there was yer ship, fifty years out of date and only five years old. Somebody bought her for scrap for a small pile of Gs but they put a high drive in her instead, she already havin' been equipt for the long passage and *they*

tried fer Alpha. Nine years they figured and come back with a fortune. But you know what happens. Alpha ain't got any fortunes and never did have and greed took them farther and yer crew came home to people they didn't know . . . well, we won't talk about that. But yer see the mess she's in."

He got rid of his cud and gnawed another one from the verminous plug he kept in his hip pocket. When he got this going he pointed a solid finger at the steering diagrams.

"They ain't built anything like that they tell me in two thousand Earth-years and it's been renewed once. That's your department, Mr. Corday. Bulkheads, berthings and the steering. Bridge instruments and communications. Yer got a full bill. But that there steerin' is what yer need to start on first. Last trip we went appetite over tincup when we hit an atmosphere in Rigel Kentaurus. Bashed things up. So yer got a hurry job and they'll thank yer handsome."

The Deuce looked expectantly at the bottle, Alan's liquor ration, which perched on the desk and then, being unable to communicate the hint, swung his leg down from the arm of the chair and stood up.

"When yer got it figured I'll send up a couple welders." He looked uncomfortably at Alan, not sure that he had been heard at all now. Then he shrugged. "Well, good luck."

He had been gone for some time when Alan realized he was no longer

there and talking. The antiquity of these plans. And yet they were drawn only fifty or sixty ship-years ago. And the spelling was so ancient that it almost required a linguist to translate.

He became aware of some one at the door and looked up with a start. She had been standing there for some time, poised and indolent, looking at him, her eyes soft, a little taunting. He recognized the girl in the dive.

She was wearing new clothes, clothes designed to show what they were supposed to hide. He knew her suddenly through and through. She knew a great deal. And she was lovely and knew that as well.

"Hello," she said.

Alan stood up out of manners.

"I am Mistress Luck and you are the captain's new mate. Ah, what a beastly little room they've given you and the whole sixth deck as empty as a drum."

Her perfume reached him and a sudden aching nostalgia took him. Gardenias. Gardenias and a ball and New Chicago.

"Not even a sheet on your bunk. Poor boy. Stay right there, I'll be back."

He did stay there, standing, eyes turned to what he had left behind him, his heart beating unevenly, his brain whirling again as it had almost ceaselessly since his misadventure. How old would Chica be when he saw her once again? How old?

She mustn't wait! She mustn't. But she would be happy for two years and hopeful. Then she would



S N O O Z E R

worry a little for three. And at last she would have to assume that he was dead. The long passage would never occur to her. It was not too well known. The ships which returned were few and new ones seldom joined the strange trade. She mustn't wait. And yet fear told him that she would. And the years would pass by—

Mistress Luck was pouring him a stiff drink. "Now you mustn't neglect your rations. That keeps a man going, keeps him from thinking. You don't want to think, you silly boy. Why think? The Universe is broad."

He looked into the amber fluid and heard her behind him, making up his bunk. And then he looked up and saw Jocelyn.

It was not strange that Jocelyn should be there, for this was only a

step from the bridge.

"Hard at work, I see," said Jocelyn.

Alan stood up, sullen.

"Come, my dear," said Jocelyn. "I've a thing or two to be done."

The girl deliberately finished the bunk and then gave Alan a slow look. "Don't let them abuse you, fellow. When you want something, sing out and make them step. Hasn't he told you you're third in command?"

Jocelyn twitched at his belt. "Mr. Corday, it is part of my lady's duties to see that officer's country is comfortable. She takes many privileges. But not too comfortable, Mr. Corday."

Alan flushed to his hair roots.

"And," said Jocelyn, letting the girl step into the passage, "not third in command, Mr. Corday. That's earned and you haven't earned it."

Shall we go, my dear?"

He escorted the girl along the passage and to his own quarters. Their door slammed and there was silence.

Alan had stepped out of his door to watch them go and the heavy voice behind him startled him.

"Well, well, sonny. So you run afoul of that."

He turned to find a woman. She was heavily, even magnificently dressed and she had ropes of pearls around her throat. Her voice was husky, cigar husky, and the wreathing smoke of a black cheroot coiled around her face. Her white, larduous flesh fell over itself in rolls and she was old. But her eyes were young and there was coquetry in her voice. Alan shuddered.

"Ask yourself what happened to our old second mate, Mr. Corday. And then think about a lot of things. Well, aren't you asking me in?"

"By all means," said Alan swiftly.

She settled herself in his chair and took up his unfinished drink, looking archly at him. "Seems to me you have a lot to learn, Mr. Corday."

"So people find time to tell me."

"And it's true enough. What do you want with a woman like that? Takes experience to know what a man wants. Lots of experience, Mr. Corday. Blah, issue liquor! I'll have Marby bring you something easier on the pallet. Marby's my friend. They're all my friends, Mr. Corday, even the ones the sawbones drove daffy. I suppose you're won-

dering who the devil I am."

"To be frank, I was."

"Well, to be frank, I'm Queen. There are a hundred and twenty souls in the *Flea Circus* this trip. But there's only one Queen."

"I dare say you're married to some gentleman aboard?"

She laughed and laughed and looked at him and laughed again. And then, with another solid slug from the bottle wheezed. "Oh, that's rich. Who'd ever have thought of it."

"I did not know I was so witty," said Alan.

"You ain't witty, son. You're just a little green. You got any idea what the turnover is in the stars?" She gradually subsided and for a moment was serious. In a flat voice she said, "I had a man once. Married true and square. But he's dead these ten ship-years. Jerry Boanne. You ever hear of Jerry Boanne? But you wouldn't. That's hundreds of years before you was born. Skipper he was of the *King's Lion*, Earth to Venus, Venus to Earth and then he took what didn't belong to him, a hundred million in gold and he hit the long passage. Well, the devil with it. It's over and last trip I couldn't even find his grave. There was a city on it. Would have amused Jerry. Buildin' a city on his bones. You got any cigars? No? I'll have Marby bring you some cigars. He's a bad cook but he's my friend. They're all my friends. And you, too, Mr. Corday. Now to business."

Alan began, "I am sure—"

"Oh no, you're not, sonny." And she surged forward, glanced up and down the passage and closed the door. It was a bare room but it had a desk and several shadowed corners; she made certain they housed no microphones. Then she began to speak, rapidly and low.

"Kid, you're sick. I know. And you didn't ask to be here."

"That I did not," said Alan.

"Kid, you're the first chance we've had."

An electric thrill of expectancy crackled through him.

"You don't know Jocelyn yet," she continued harshly. "You may think you do but you don't. He's rotten, rotten clear through. Behind that handsome face there's brimstone burning. Few of us are here from choice. But we haven't had a chance."

"What are you talking about?" he said, matching her low tones.

"Let's not sport around, sonny. You want to get home?"

"I've got to!"

"O.K., sonny. You're a tenth class. You can cover a lot in courts. You belong to a period that's still alive back there. You can navigate a ship because you've got education. You can make it smooth for us when we arrive."

"Wait. I haven't any power back there. I'm a noble, yes. But when the money is gone the title goes. You—"

"Devil take the money. There's

millions loose in this old hooker. Money's nothing to us, any of us. See these pearls? They're worth a hundred thousand. Well, blink but they are. And there's the most of us that's sick of this. We want to go back, not to live in these metal walls any more, to have a chance. And you've got to help us."

"That's mutiny?"

"Call it an ugly word if you like. There's no law in the long passage but a captain and captains come and go. They come and go, kid. You understand me? And there's only one way to go on the long passage."

"If you mean murder—"

"More ugly words. Call it murder. You won't get spattered. Will you play?"

He hesitated.

"Don't be a fool!" she said hoarsely. "You want home. You've got a dame waiting. I can tell."

"What will I have to do?"

"That's better." She sank back and crossed her fat legs. "You can't run this hooker yet and she can't be turned in midflight the way she's rigged. Her steering assembly, accordin' to the Deuce, is about ready to cave in. You want to get home?"

"Yes!"

"All right. You stand by. We'll take care of all the details. Don't let on to the crew you know. There's plenty that are in but some there are that ain't and you don't know them. You're an officer. You can stand off. Don't look for no signs for if Jocelyn knew this—" She made an expressive motion with her hand.

"Now for details," she continued. "In about two minutes European you bone up on everything you got to know to swing us back to Earth. And you spend every wakin' second fixin' up her steering assembly. You'll get the word as soon as she can be turned midflight. Savvy?" She extended her palm to him. "Pardners?"

His hand was shaking with excitement as he extended it to shake and he instantly steadied himself. "All right," he said in a controlled voice.

She threw off the last dreg in the glass and got up. Before she opened the door she gave him a broad wink. "You're a good boy, Mr. Corday. I know we're in good hands."

V.

The bridge was 'midships, deck running the total diameter and perpendicular, like all decks, to the line of march. Like a belt around her center ran the observation ports and jutting a trifle from her otherwise smooth lines were the bridge wings, bubbles of gamma and psi proof glass from which a landing could be conned. The metal controls were dull beneath a coating of scum and the meter faces and screens were smudged with fingerprints. Half the dials were broken and the deck coating was worn through to the metal in the most frequented places. But it was a bridge and there was something of silence and smartness there.

Every five ship-hours the watch changed, the captain relieved by

Hale, Hale relieved by Corday, Corday relieved by the captain. But it was a strange procession of reliefs. For Jocelyn stood his watch in his cabin with a stand-in on the bridge and Corday was accompanied on the bridge by a junior watch officer who should have been called a guard, since he knew nothing of the mechanics of control.

The captain's stand-in was the ship's atmosphere pilot, a man whose name had degenerated to Swifty, a satire on the fifteen hundred miles an hour his scout plane could do. *En voyage* his charger was housed in its hangar aft and, as one of the engine-force was assigned to its maintenance as additional duty, the atmosphere pilot could be pressed into service here.

Swifty was young, English and always staggering drunk. He had come out of a war now three centuries forgotten to find that peace was dull and women were fickle. He had signed on the long passage of his own free will and he took his pay in whiskey. And while he could not have conned a landing of such a large vessel, he could be trusted—captain within call—on a routine watch. Pink-cheeked and blear-eyed he would stagger up a companionway from officer's country, plant a full bottle ceremoniously on the ledge before the communicator, give a low salaam to Corday and flop into a seat in the wing. Corday was then to consider himself relieved.

Alan would make his log entry, give a last hating glance at the outer

dark and plunge below to busy himself with steering assemblies. For five hours he would slave over the plans, tracing leads and fuel tanks. Then for a restless and worried four and a half hours he would sleep. And then, gulping down a soggy breakfast in the wardroom, he would plunge up the companionway to the bridge to find Hale wearily looking for him.

Hale was important. He did all the navigation and he had a lot to teach which Corday had to know. He had been very amazed at first to find the second so transformed but with gruff heartiness set about instruction. It meant a little from Corday's sleep and a little from Hale's relief. But each change it got a half hour's instruction across which Corday could then pore over and digest in the remainder of his watch.

It took some of his supreme confidence away about his own education, this navigation. For Hale was proudly "a "practical man" which meant simply that he hadn't been to school. The big, blustery spaceman had learned his mathematics so long ago that Corday could barely follow them. Just as he had difficulty understanding the archaic speech of the people aboard, he had infinite trouble deciphering the tattered texts by which Hale swore.

Algernon Leckwalader's "First Steps" was Corday's worst hurdle. Leckwalader thrived on obtuseness and told anecdotes. He began with a page full of "ifs" and would not com-

mit himself beyond an occasional "probably". He favored spectrum navigation and the three-dimensional plot which he derived from descriptive geometry.

"When I first took up the business of bein' a space artist," Hale had said, "I figured you just made up your mind where you was goin' and went. But there's a lot of dead ships full of deader men out here that found it don't work. If you don't mean to become a derelict in orbit around some furrin' star, you better digest all you can get your paws on. Every time we get back we hope to find some other bucket of bolts with later plots than us. They don't print them on Earth, you see, aside from a little hand-copied stuff they want fifty-hundred thousand dollars for around the spaceports. So that leaves a man with his own ship's logs and observations. And stars change.

"Now behind you you see stuff one way and ahead you see it another. Age is strung out to the rear and run up a few hundred dozen times to the front. Wouldn't be so bad if you was always goin' or comin' from the same stars. But you ain't. So you have to calculate the spectrum for each angle of approach and departure and the spectrum changes for every angle. So it's a pile of memory. But we navigate in close so you only have to know about a thousand spectrums for each of sixteen navigational stars and then you got identity."

"But how do you know Earth?" Corday had consistently asked.

"Well, Earth's easy. You just figure out where it ain't and head for where you guess it may be and pick out a pin point amongst a lot of bigger pin points and you come right on in. You read Leckwalader on Star Selection, Mr. Corday."

And so it would go, confused and uncertain. But watch after watch and in the spare hours of his duty day Corday studied. He got so he could hold a celestolabe steady and get a fair sight and finally progressed to a point where he knew what he was getting a sight on.

And the Queen, now and then, would pass with a wink and a nudge and ask after the steering jets and balances in a cigar-husky voice.

It was this assembly which gave him the most worry. He was at a point where he dreamed tube systems. The *Hound*'s jets had been rebuilt three more times than the Deuce had known. And after many a painful tussle, crawling in cramped compartments, a conference with the diminutive chief would disclose new difficulties.

The system was essentially simple. Thirty jets in a ring around the nose, thirty in a ring around the tail. The old *Hound* had been built a man-o-war and she had been made to maneuver. But later men had had other ideas for her, ideas which had never been written down. Apparently she had but sixteen jets now working. Originally all jets had operated from two fuel tanks but these had been pre-empted for water storage when they refitted her for the

long passage and new leads had been installed from the chemical landing fuel tanks. But such an arrangement is dangerous as a fission landing is always possible but fission steering is not due to the intermittency of the required blasts and the minor caliber of force needed. And some genius had hidden two new steering tanks, one in the bow, one in the stern and had cut in only eight of the thirty, bow and stern. Which eight fired was a matter of outside inspection, icebox stuff.

Corday did it with magnetic shoes clinging to the hull and absolute zero pressing his spacesuit a fraction of an inch from his body. He found the tubes and marked them and returned, chilled despite his heating unit, chilled enough to shiver for twenty hours after in the not-too-warm ship.

Feverishly he reconnected leads, refitted pumps, re-enforced feeds and generally got on with the business. But he was irked by the petty duties with which Jocelyn distracted him.

"Mr. Corday," Jocelyn would say, as Alan came down from his watch, "decks fifteen and twenty are hog pens. Take ten men and a petty officer and see personally that they get cleaned. How can you let your people live in such filth?" And Alan would rage behind an obedient face and do as he was told.

Or, "Mr. Corday, we've another communicator breakdown between bow and second con."

Or, "Mr. Corday, take three men and check the spoiled stores. That confounded cook will have us all

down with bellyaches."

And Jocelyn would hold him in idle conversation about recent books and music or ask him about some recent discovery in engineering and would burn an hour or two of irreplaceable time. Alan felt the man sensed his second's impatience to be off and liked to annoy him with these idle time wasters.

Three times he felt he would have the steering system ready in the next watch. Three times he suffered disappointment on discovery of a bad fitting or a broken pump.

"I admire the way you're buckling down, Mr. Corday," Jocelyn told him one day. "A few more weeks like this and you'll make a first-rate officer."

Alan was suspicious of sarcasm but it was one of those rare moments when cynicism and contempt did not mar Jocelyn's splendid face. Then Corday felt guilty and crawled off to his bunk to wonder how low a man of honor can fall.

VI.

Too much work, too little sleep and bad air mixed a combination too strong at last for Alan Corday. At this stage of his career, whatever legends say to the contrary, he was only a very young man and a young man without experience to steady him and without a solid backlog of reversals to teach him his capacities. He had been living feverishly on hope for days beyond his counting and the high flame of expectancy

burned fast on the fuel of his strength.

He was not certain just when it was he began to fail. One watch he was quivering with the excitement of having learned at last how to locate Sun. The next he discovered himself staring apathetically at his calculation board, barely able to hear Hale's amiable rumble a foot from his ear.

"I said, 'Now plot Vega,'" repeated Hale.

"I beg pardon?"

"Say, what's the matter with you? I been beating my lungs out putting know-how into you and you been dreamin' about the lost plate fleet. Hello, skipper."

"Something the matter with our young friend?" asked Jocelyn.

Hale leaned far over the plotting board and looked back into Alan's face. After a very critical inspection he shrugged. "Well, call it space fever. Tain't the gravity jigs nor yet the air weebles."

"I think Mr. Corday needs a rest," said Jocelyn.

"No, no!" said Alan. "No, I'm all right."

"Mr. Corday," said Jocelyn, "they are having a sing-song in the crew's mess hall. I told them I would come. Go down in my stead. I'll take your watch."

"No! I'm all right!"

"Permit me to observe," said Jocelyn, "that you have just received an order."

Alan got up and found his legs unsteady under him. The bridge

seemed to swim and he righted it with difficulty. The band of black ports all around it started to revolve. He stopped them.

"Yes, sir," he said and stumbled for the companionway. His guard, Gow-eater, followed him, laughing with pleasure at this shift of duty. It was not that Gow-eater ever stopped his nervous cackling but it took on different notes and this was one of pleasure. The man lived for his bunk and his pipe and his pay went extravagantly to Marby the ship's steward for small black pills adulterated half a hundred times. He was the most reliable man aboard when it came to a simple duty—a threat to take away opium would even stop his chuckling. Of him Jocelyn had said, "I'll trust a man with loyalty, even if it's only to a small black pill." Gow-eater couldn't sing but he liked singing and he was impatient as he had to help his charge along.

The strum of stringed instruments hummed up the ladder into the mess hall and Alan felt his way down to the strains of "Spacemen Never Die."

The music stopped as he entered and half a hundred faces, women and men, turned to him expectantly. He came out of his daze long enough to realize that he was Jocelyn's representative and he said:

"Captain's compliments. Regrets absence. Be pleased to attend in his stead." And he sank thankfully into the chair they'd reserved for Jocelyn. What was the matter with him

suddenly? He tried to locate Queen in the crowd and give her a reassuring nod but she was busy pouring beer and fighting off the maudlin advances of a driveman. Alan sank back.

The orchestra, a small, off-key collection of strings and one horn, struck up, with the license of such occasions, "The Captain's Alibi." The beer passed around, voices belied the choruses and feet stamped. Alan sat leadenly and dull, fighting off what looked like lowering curtains of darkness.

"Go on and sing," said somebody beside him. And he saw that Mistress Luck was there, pressing a beer mug at him. "It isn't much but it's all we've got, honey. A few songs, a few kisses— Go on and sing."

He tried to manage a chorus but he didn't know it and realized suddenly that he was barely whispering anyway. A crewman handed him a glass of flaming spirits and he downed it with the hope that he would come around. He did for a little while. And then they gave him another and yet another.

He was very hazy afterwards as to what happened. He awoke once to find himself looking at a ring of young faces drawn off from the crowd to which he was teaching a ditty he had learned in school against the competition of the orchestra. And he awoke again to find the arm of Mistress Luck about him and her breath cool against his hot cheek. He could afterwards vividly recall a ragged tenor singing "The Castaway

Song" and a girl with a husky, wanton voice half whispering "Heart For Sale". But his first recollection that he could identify as his own came after. How long after he did not know.

The little girl with the dirty face was stirring up some broth beside his bunk. Snoozer, the captain's runner with a fresh bruise on her cheek.

"Hello," he said weakly.

Her eyes flashed wide in fright and she backed up from him and then she recovered herself and came closer with the broth.

"Drink it," she said.

But he had drifted away.

When he next knew anything she was still there but the bruise was gone and her hand was bandaged instead. She was sitting, half asleep when he first opened his eyes but she came up like a ramrod as he moved his head.

"Please don't rave any more," she said. And she hurriedly began to stir some powdered milk into a water glass.

The words turned Alan cold. "Who's been in here?"

"The doctor."

That was bad enough. "Anyone else?"

"The . . . the captain twice."

"Quick! What did I say?" for the chill fear of it was on him.

"Nothing! Please don't shout at me. Please don't!" And she began to cry.

He lay back and took the milk.

"You are sure I said nothing? Neither to the captain nor to Strange?"

"I . . . I don't know about the doctor," she said, scrubbing at her eyes and smearing the grime. "He came many times."

"Many times!" said Alan. "How long have I been here?"

"I don't count watches any more," she said. "It's been a long time."

"Has . . . has Queen been here?"

She tightened her small jaw. "She came up but I wouldn't let her in. I couldn't stop the captain could I and you . . . you might have died if I'd stopped the doctor." And she began to cry.

Alan writhed like a criminal at her tears. He put aside his worry about Strange. He would see the man soon enough, he knew. That he had not been shot out of hand seemed to demonstrate that Jocelyn did not know. He fumbled out with his hand, rather amazed to see how thin and shaky it was and amazed again to feel how thin was her arm.

"Come here." He drew her over gently to the side of his bed. "Who assigned you to this job?"

She straightened up, all valiance. "Nobody. Do I have to be told to do everything?"

He looked at her oddly. "Why did you do it?"

"Because I could. Tito has my runner's job when I'm gone now. Because—" She averted her face and got very busy with another glass of powdered milk. "Because maybe I

couldn't make myself not do it. Drink this."

Alan fumblingly took the milk. He regarded her with a dawning appreciation. Drowsiness was coming over him, a healthy drowsiness. "You know," he smiled, "I saw a painting like you once . . . the painting of a countess . . . if you'd wash your face you'd . . . you'd—"

The girl caught the glass before it spilled and set it on the table. She put his unresisting arm under the covers and pulled the blanket to his chin and then stood back, looking at him with her head cocked first on one side and then the other, a proud smile on her face. Then, exhausted, she curled up with the comfort of never having known anything else on the hard metal deck and was soon asleep.

The next thing Alan knew he was awake and alone and Dr. Strange was standing close beside him, ruddy face limned with his deceptively holy gray whiskers. The girl was gone and the door was shut.

Dr. Strange was smiling an odd smile.

"Well, how is our mutineer today?" he said.

VII.

He wanted the log when he got around at last. He stood by Swifty for half an hour waiting for Jocelyn to take his usual "noon" glance at the dials.

Jocelyn came at last, bored and cynical, in starched white shirt and pants and a spaceman's fatigue cap.

He swept a languid, uninterested eye over the bridge.

"Hello, Mr. Corday," he said, glancing now at the meters and screens. "I see that somehow you managed to survive."

"I feel very well now, sir," said Alan.

Jocelyn squared around and looked straight at him. His inspection was brief but he saw what he wanted. "You can always tell the strong ones," he said. "They don't crawl to bed at the first sneeze." And he went on with the dials.

Knifed by the injustice, Alan started to hurl a hot reply but he quickly recollected his purpose here. He wanted a look at the log. He had to know how many watches had passed, what average speed had been made and, in short, he wanted to be able to compute how much Earth-time had been let go.

"If I could be entered in the log as returned to duty, I would be much obliged, sir."

Jocelyn said nothing. He was checking Hale's navigation now, left there when Hale went off watch but locked down for only the captain's key.

"If I could be entered in the log—"

"You need not repeat yourself, Mr. Corday," said Jocelyn, closing the navigation work book with a snap and locking it. "My hearing is extremely good." He wrote a set of steering corrections on the slate above the controls, glanced at the steersman to see if he was awake and



looked back at Alan. A very faint smile was on Jocelyn's mouth. He looked on by to Swifty.

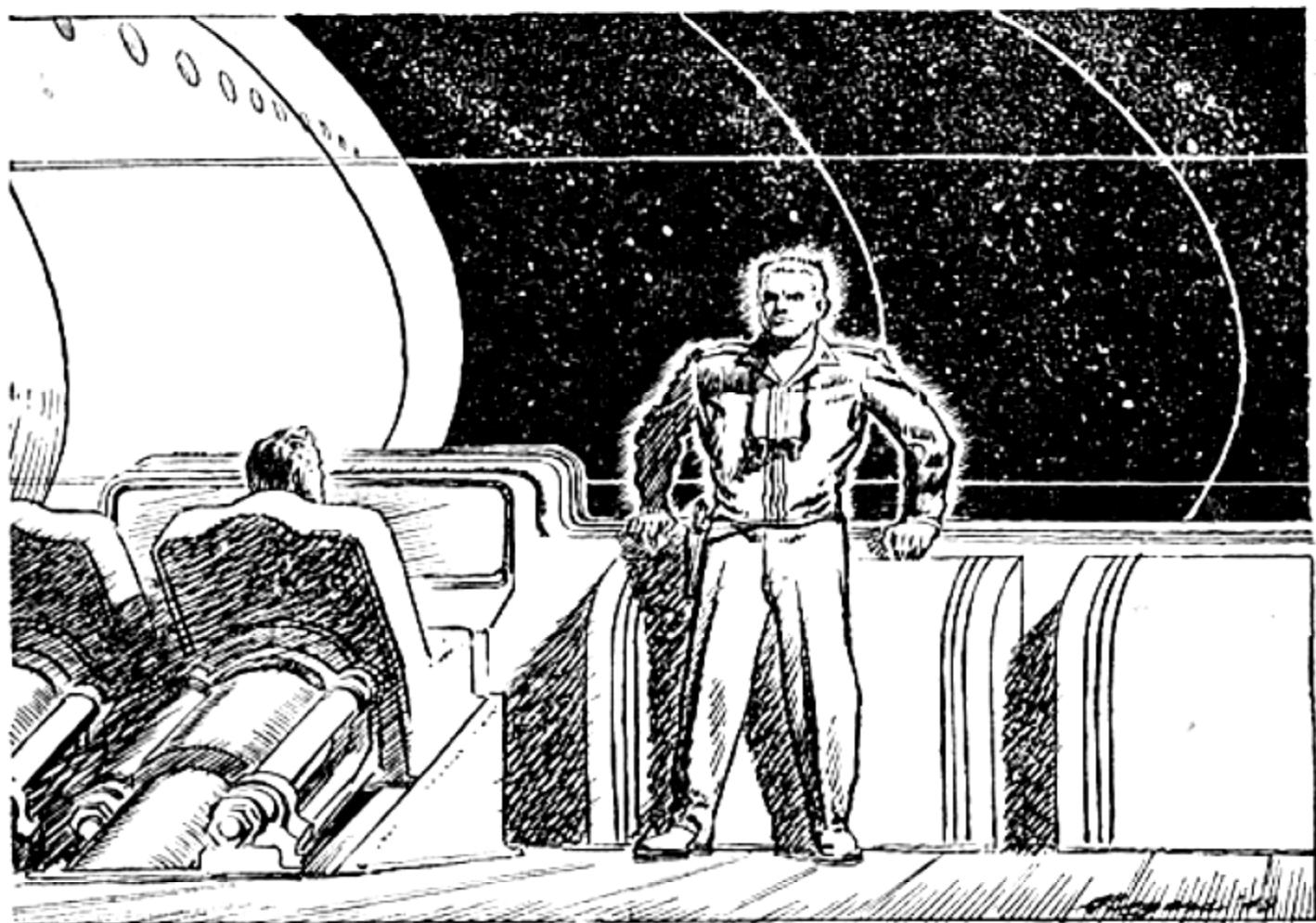
"Sir, Mr. Corday seems quite anxious about the log. He is not to be given access to it. A plain sheet of paper will take his entry as watch officer and the navigator will copy it in later. Pass the word along to the quartermasters." He looked back at Alan. "And so our poor, sick boy returns to duty."

He went down the short ladder which dropped to his quarters and turned at the bottom. "If you ever manage to conquer some of your weaknesses, Mr. Corday, you will be instated as third in command. Until

then, to you as to the crew, both the log and position book will remain secured. I call your attention to the destruction locks on both." He entered his cabin and was gone.

Alan felt weak and not just from his illness now. A pandemonium of unanswered questions racked him. He was so entirely confused that he almost blurted some of them aloud to Swifty.

But everything was the same to Swifty. It always was. He had poured himself a stiff jolt from his bottle, a ceremony after every dial inspection and was now nursing it down, reading the new courses the while.



Startled and plainly scared, Alan stumbled down the companionway to the mess hall. None spoke to him, not an unusual thing for Alan but today potent with meaning.

He fumbled at the berthing doors and went distractedly down to the sick bay.

Strange was there at the far end, feet on his white desk, spectacles unused on his forehead, wetting his thumb against turning the next page of the new treatise he was reading.

Unexpectedly a small form barred Alan's way. Still wrapped in his dirty, floor length man's jacket and with the identical dirt on his face, the "assistant surgeon"—as the crew

joshed him—blocked off the far end of the sick bay.

"The doctor is very busy," said the child.

"See here," began Alan.

"He gave very big orders that he was not to be disturbed. Not by you, Mr. Corday, especially."

Alan would have brushed the child aside. But the doctor, although it would have been impossible for him to have missed this conversation held so near him, gave no sign.

Irresolute Alan took a step forward. Placidly the doctor turned his page, raised his spectacles a little higher on his forehead and went on reading.

Breathing hard now, Alan suddenly thrust the child aside and strode forward. He slapped the book down to the desk. The doctor's spectacles dropped with a click to the bridge of his nose and he looked up with mild surprise.

"Why, Mr. Corday."

"See here, I am certain you've told. You said you would not. You cheat! I promised you my pay for the entire cruise—"

"Mr. Corday, if you were stood against a bulkhead and shot, which is the lot of a mutineer as anyone on this ship can attest, you would draw no pay. The information is worth about fifteen thousand dollars to me if I keep it to myself. I am very good at keeping things to myself, Mr. Corday. Now if you will just close the door quietly as you leave—"

"But he knows!" said Alan. "I am sure that he does!"

"And what convinces you?"

"He . . . he—" but now the evidence did not look so good. "He barred me from the log and the navigation book."

"Captain Jocelyn," chuckled Strange, "is a man of uncertain moods and extravagant whims. Perhaps he does know. Of that you may or may not have a future clue. But you will recall a day, shortly after you came aboard, here in this hospital?"

Alan did recall it. The spaceman had fallen not three feet from where he now stood.

"You're still alive, Mr. Corday. And so I doubt that our gallant cap-

tain has just the evidence you suspect. But he might, he might. A deep man, Mr. Corday. A very deep man." And he propped his glasses upon his forehead, readjusted his feet on the desk and located his place in "Abnormal Psychology" Volume III "Methods Used By The Asian Secret Police To Create Insanity." Placidly he became once more absorbed in his book.

Alan shivered. He stepped back, gingerly avoiding the place where the spaceman had fallen and left the sick bay. Behind him, just as he closed the door he thought he heard the doctor laugh. But he could not be sure.

Minutes ahead of time, drawn white with his recent illness and present uncertainty, Alan relieved Hale. Here he thought he might have a clue. Hale ran brook deep; every emotion of the man played on his face like searchlights from within.

But Hale was drowsy, yawning, leaning half over the drive communicator, and he gave Alan as little attention as though he had been a steersman.

"Keep her at least two thousand miles short of Constant," he said, stifling a yawn. "The Deuce has got hot atoms back there all of a sudden. She came up within a thousand half an hour ago and I check blasted back. I'm bored."

"Then I relieve you, sir," said Alan.

"But we'll be at Johnny's Landing in about thirty watches. Then watch

me kick my heels." The thought cheered him and he laughed. "They got a concoction there they call 'low fission' but there's nothing low about its effects. Tobacco juice, red pepper, HCL and a dash of strychnine—the last to keep the heart goin'. Here's a blank sheet for your entry." And he was gone below.

Alan had strained to catch every nuance of Hale's rumble. Surely the man was incapable of playing a part. He had always thought so. But now he wasn't quite as sure. The blank sheet Hale had flung to him had chilled the effect of the friendlier utterances.

And then the light beam which shined in the distant nose of the *Hound* began to catch too many of its own particles back in its face too fast and the speed dial crept up to one hundred and eighty-four thousand five hundred. Alan spoke sharply to the communicator man:

"Check blast five hundred."

"Check blast five hundred, sir." And then, "Drives receipt check blast five hundred, sir."

Bridge discipline had relaxed when Hale went aft. "She smells a bone at Johnny's Landing," said the steersman to a quartermaster.

"Just so you aren't on trick to crash us in and plow it up," was the petty officer's brittle retort."

"Silence on the bridge," said Alan. They looked at him without respect and complied for a while.

Alan felt the deck grow a trifle heavier under him and glanced at the speed dial. She was riding now at

one hundred and eighty-four one hundred.

"Check blast one hundred."

"Check blast one hundred," acknowledged the communicator man, omitting the "sir" as a rebuke for the silence command. "Drives receipt check blast one hundred."

Alan kept his eyes on the speed dial. It sagged back to one hundred and eight-three nine hundred and hung there. It annoyed him. And he was about to give the engineer watch a warning bell to get on its toes when suddenly the littleness of his authority, the insecurity of his position, his uncertainty and his thwarted hopes all settled over him, a cloud on top of his convalescence.

Dispiritedly he threw in a gong which would be tripped if one hundred and eighty-five thousand miles per second would be reached and took himself off to the bridge wing.

The stars were cold and inhospitable before, behind, above, below. The scarred hull of the *Hound* gleamed faintly with the particle absorption of fast flight. He could feel the chill of absolute zero even through the ray-proof panes. Dark and cold, cold with a cold wherein no motion was possible in fluid or gas.

He put his arm against the rail and buried his face in his jacket sleeve to shut it out and so he stayed through half his watch. The gong rang three times and then three times again.

Let her go. Let her edge on up to Constant. Let her flash on through

zero time and explode to pure energy or let her hang as one ship had at the exact speed of light and hang there forever, impervious, unmoving, her people statues within her, locked, protected and condemned to eternity by zero time.

Jocelyn's voice was thin with contempt. "Am I disturbing your rest, Mr. Corday? Or are you sitting this one out? Quartermaster, check blast a thousand."

Startled, Alan stared into the bridge. Only the communicator man, the steersman, the quartermaster were there. The bridge speaker had opened and it clicked shut now.

Stammering, Alan repeated, "Check blast one thousand!"

The communicator man did not answer him. The needle on his dial stood already at that figure. He brought the handles back and the gong stopped ringing.

Alan waited the remaining two and one half hours for Jocelyn to come to the bridge. But Jocelyn did not come.

The gong had not been loud enough to reach to Jocelyn's sound-proof quarters. He had not known the captain had a repeated dial. But Jocelyn did not come and Alan kept the speed as near one hundred and eighty-four as human error and the grossness of drives would permit.

Swifty came up, put his bottle down on the communicator ledge, scanned the dials, scratched himself awake and gangled over to Alan.

"One hundred and eighty-four and steady as she goes," said Alan and

hastily fled from the bridge.

There was a box of antisleep capsules on his desk. He gave them an hypnotic stare and fell exhausted on his bunk. But he did not sleep. At every footstep in the passageway he tensed, when any careless passing elbow brushed his lock he saw again the spaceman trying to get free.

And when he had at last dropped into a fitful doze a hand shook him rudely and he was sure of his fate at last.

It was only a quartermaster. "Time for your watch, Mr. Corday."

VIII.

"Well, it's like this" said Gow-eater, flopping against the rail beside Alan and waving a hand out of the port at the tangled valleys and mountains below, "if they stayed put, there wouldn't be no variety in it."

They were in second con, standing by preparatory to landing. It was an all hands evolution and, the ship being about a quarter manned, everyone down to five years of age had his or her post. It took a lot to bring the *Flea Circus* to ground, particularly where no landing racks had been provided and in strange areas Jocelyn liked to have at least token crews on her after batteries just in case somebody proved hostile.

They had been bobbing now for about ten hours above the planet Johnny's Landing waiting for Swifty to come back in his dilapidated atmosphere craft and tell them where the population had got to.

Gow-eater had been without his "black fuel" for many watches but, anticipating a new supply, he had mellowed himself pleasantly. "I ain't no hand at guessin' at time, but I swear it couldn't be more than five hundred planet-years since we hit this place. There was a row of buildings right down there where you see that river turning between the green cliffs. They was strung out along the top with the fields behind. Some mighty pretty girls, mighty pretty. And obligin', too. New planted place, mebbe a thousand years old by now, though it's easy to get mixed. Been a ship-year since we was here and my memory's bad anyhow. Course, might be twelve hundred planet-years since we hit the place—I might have mislaid a trip. But no, I think it's nearer five hundred.

"Nice place. Diamonds in that river gravel big as biscuits—uranium in that string of hills over there so's a counter nigh kills itself—and they raise mighty good apples. You sure you don't even see a foundation left, Mr. Corday."

Alan obliging looked for the tenth time since planet dawn and then laid his glasses aside. "Nothing on those bluffs but grass."

"Well, Swifty'll find 'em. He's the dangedest gent for findin' things. Especially girls. But don't recall his takin' ten hours before on anything." Gow-eater began to fidget. "You don't suppose he found 'em and landed for his own good time, do you? The skipper'd kill him!"

A gong clanged and they stood more precisely to their stations. The ten-year-old kid who was handling second con's communicator bent a keen, veteran eye out the port and said, "There comes the—"

"Bill," said his mother sharply from her post at the phones, "you watch your language."

"Well he does anyhow," said the undaunted Bill.

They watched their controls moving in repeat to main con for this was only the emergency bridge, manned against machinery jams or shellfire. It was close to the drives and the chemical explosions as the big vessel edged ahead made the auxiliary bridge rumble and the compasses slide back and forth on the chart board. The finite dial climbed sluggishly to six hundred mph.

There was a dull thump and a whine of machinery as the atmosphere plane was drawn into the hull.

The woman on the phones waited as long as her curiosity could stand it and then said, "Irma! I mean bridge. What's he say?"

The people at secondary looked alertly at the phone station and the woman tipped them a head bob which meant she was getting it, to be patient.

The controls moved spectrally under the second quartermaster's gaze and the *Hound of Heaven* edged to planet northeast and picked up speed. They ran rapidly to dusk and then altered course, turning due north to parallel a silver lake of great length which shortly became a river.

"Irma says there's a vessel up here. Swifty changed signals with it and he thinks it's the *King's Lion* out of Boston. He took so long to tell the whole of it because he was so dry." She laughed fondly and then straightened her face quickly. "Don't you ever take to drink," she snapped at Bill.

"Honest to Pete," said Bill in shrill exasperation, "I—"

"Shut up," said his mother. "He says there's a town up by the sea-coast. Was there a sea on this planet, Gow-eater? No, that was the Idylwild that didn't have a sea over on the Mizar beat."

"I didn't have no time to look at seas," said Gow-eater with a grin. "But they better be as industrious as we left 'em."

"Trade prices will be bad," said the woman. "Confounded Boston ship."

"Don't crab about it," said Gow-eater. "That's the first hooker in our own class that we've struck out here in two ship-years."

"There she is!" said Bill, off station again.

A moment later bridge sighted her with the help of metonic locators and the uneasy situation of second con in regard to gravity—since her decks were perpendicular to planet surface in this cruising position—was corrected by the bow pointing skyward as they crawfished down.

Twenty minutes later they were sitting on their tail beside a thundering sea which glowed in the deepening

darkness and the crews of each were mingling on the intervening sand.

Alan stood by himself, glad to feel ground, glad to breathe clean air, not quite as nervous as he was since time spent here was equal with Earth time but anxious to be away all the same.

From the scraps of conversation in the groups around him he gathered that while the two vessels had known of each other they had never before met.

He listened awhile to two long passage men trying to find common ground and shuddered. They had been born in the same town, Old Angeles, they were more or less of age, about forty. But the family of the *Lion* spaceman had been scattered and forgotten two hundred years before the *Hound* spaceman had been born. And they considered it a coincidence that they should be "so close or a time". They swapped tobacco, groped for some common conversational ground, played out Old Angeles in a very few words and fell silent. Then one of them hopefully brought up the agreeableness of the women on Caterdice of Deneb and this promptly lapsed when the other expressed surprise since during the age of his visit the dominant race there had been African pygmy labor importation. They came at last to the solid ground of optimum chemical fuel mixtures and sat down with great relief to a pleasant talk.

Alan wandered off, feeling lonely

and shunned. He looked up at the darkening sky where a few last rays of the setting star painted the tall clouds green and gold and so different was the aspect of that sight from Earth that he realized suddenly, dishearteningly where he was, how incalculably far he was from home.

A voice reached him from near at hand, dimmed by the surf but carried on the thin breeze of evening. It was dark enough along the beach now to see cigarettes glowing in the various groups and he stood quite near the captain of the *Lion* and Jocelyn without being seen.

Jocelyn was sitting on driftwood, limned against the glow of the bursting surf, snapping pebbles at the charging waves.

"You're sure you've searched thoroughly," he was saying.

"Tucked up and left, far's I can see, cap'n. Bread in the oven, plows in the field, pigs and chickens gone wild all through the bresh. I kem in ter fix me up a trade on some of that air yewranium last planet week."

"This wouldn't be a dodge to get me to sheer off, would it, captain?"

"Jocelyn, though I be from Boston I wouldn't make er man burn atoms in such a wasteful fashion not if he war my most blessit enemy."

Jocelyn pitched another pebble. "How about the mines?"

"You ain't thinkin' of minin'!"

"I was thinking of raids," said Jocelyn. "Mines all right, no raid."

"Well, they're all right ca'se I took a meander up thar. But six

blessit days lookin' by my airplane ain't disclosed whatever. They tucked up and left."

"I was here a ship-year ago but I compute that here at six hundred planet-years. Swifty!"

"Aye, aye!" from a crowd of *Lion* girls and shortly a lurching Swifty.

"Swifty," said Jocelyn, "we've got a mystery here. You get a stretch of beach clear and clip off. Take that Bill Godine and look until you find a colony."

"Aye, aye, skipper. Shucks, another one empty. Hey, young Bill!"

The ten-year-old skipped away from his mother, eyes big and bright.

"Young Bill," said Swifty, "you are about to take your jolly old life in your two bare hands. Hip, hip. Tell Jock to tower away and all that. Hello, Corday. Would you get some people to clear that bally driftwood off the silver strand?"

The Deuce threw some power behind the searchlights and the stub-winged jet, ten minutes later, flamed up into the black sky and was gone.

Alan found himself wandering with groups toward the town, along a road overgrown with grass, between walls fallen into round, lichen-covered piles.

But he couldn't take very much of the town. Where the roofs were still intact one could enter houses and find there strewn toys, set tables, and what the sea air had left of clothing not worn these fifty years. The wandering groups of spacemen and women touched nothing, not from

honesty but from a highly developed sense of luck. But soon their superstition faded away enough to bring about the election of a mayor, the making of a bonfire from tattered park benches and the trial and execution of a wild pig who was promptly cooked and eaten. Somebody else discovered a cellar and Alan at length found himself on the outskirts of a singing crew, forgetful already with bumpers of sweet wine.

The cold dawn found Jocelyn and an exhausted Swifty hard at work rousing the crews of both ships from various postures of abandon and during the whole planet day there was not one man or woman aboard the *Lion* or the *Hound* who did not groan and shudder at the mention of sweet wine.

They transferred their landing to the site of the mines and spacemen, with many a curse and protest and many an alarmed eye on Geiger counters, turned miners.

Ten days later, pay-loaded to the safety limit and the whole vessel smelling of dirt they shoved ground for Earth while the *Lion*, with another market in mind, headed out towards Pollux.

Of the colony's fate they had no faintest clue.

"Note it down in your Star Pilot, Mr. Hale," said Jocelyn. "Johnny's Landing is open for a colony. A colony with some brains."

IX.

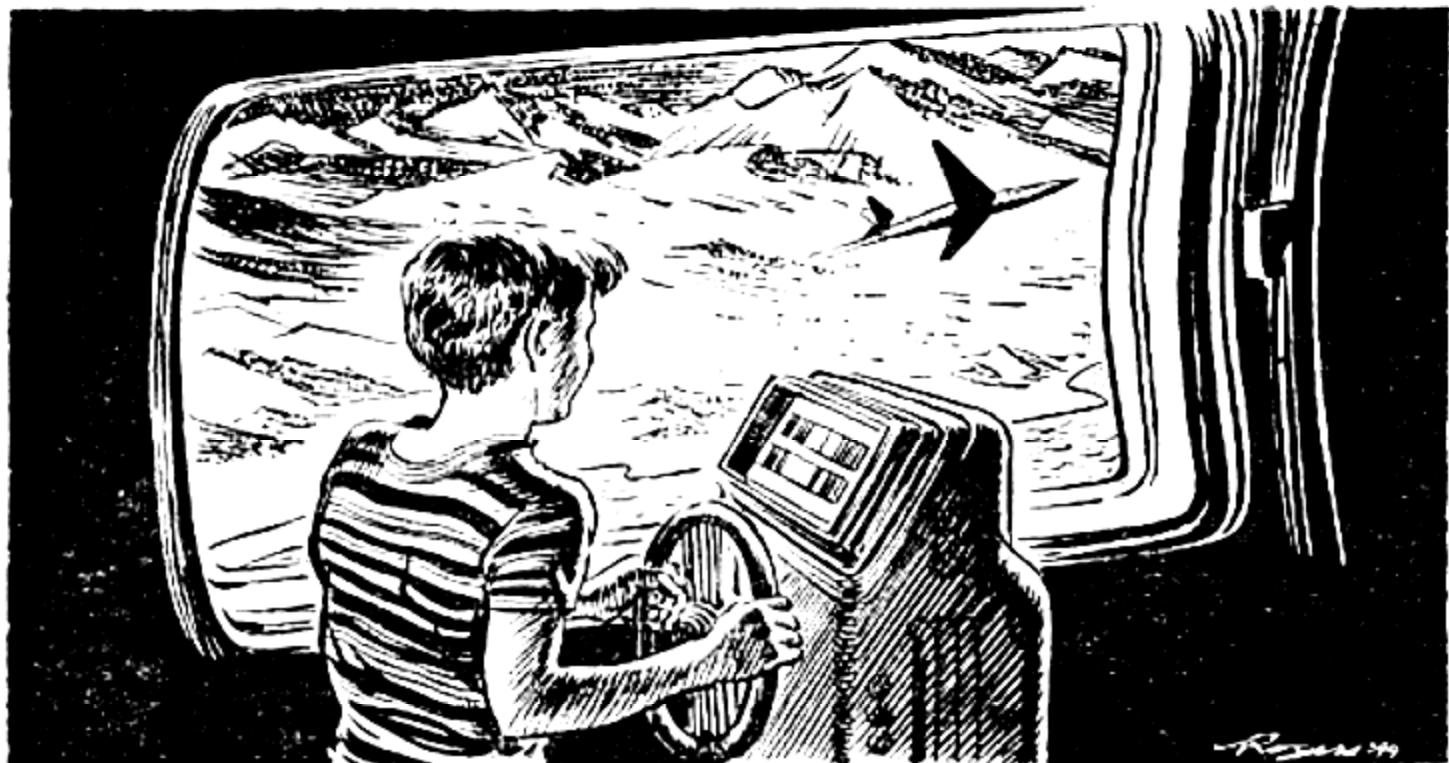
Hope beat high in the breast of

Alan Corday as the watches went 'round. Inconsistently he found himself, whenever he was on watch, willing the speed dial higher. That in itself was madness but the coldly logical part of him was not yet highly developed and home is an emotional thing.

He was going *home*. He had no idea of his distance from Earth, the number of ship hours which had elapsed or the number of years which had passed on Earth. But he was young and with each passing watch the hope beat higher. Perhaps less than fifteen years would have passed. If that were true, then he could realize his goals.

Now there was no idea of holding back from duty. He was swift to obey commands, meticulous in the performance of duty, scornful of Gow-eater's lurking presence. While he was very far from the best watch officer that could be made, he began to bring enthusiasm into his job and he was easily the best, next to Jocelyn, aboard. He studied, not navigation, but ship repair and control. He conceived all manner of possible incidents or accidents which might slow them and he set himself to thoroughly know how to best meet each one.

Whatever his former moods, none could complain of him now. In days, by a steady application of an actually brilliant mind, he digested all the emergency drills of the big ship, mastered damage control and perfected his own ship handling. He was sharp with Hale about curved space com-



putation and in this Hale was apt to be slack, running wide from carelessness and correcting. Hale, surprised, humored him and even tightened up with an amiable guffaw. Every minute of ship time saved on this run meant days of saved Earth time to Corday.

He was cheerful and alert and even the bridge crew, despite the suspicion of a very insular life aboard, warmed to him enough to say "sir". Queen he passed with complete amnesia about such things as mutiny. The Deuce he used to get a little more precision out of check blasting. Jocelyn he suffered as a necessary evil, adopting the happy attitude that whatever the man was, he was getting Alan home.

Corday began to laugh easily and naturally over minor discomforts. In a superior way he began to be very tolerant of the dirt caused by a space-

ship's perpetual shortage of water, of the antique speech of the crew and the odd morals of her officers. He could afford tolerance. He was going *home*.

Sometimes, when his cabin was dark and the ship skin cold with the absolute zero outside, actuality and doubt would try to struggle to the surface of his mind. But he thrust them down. He was young. He had hope. He had a *home*.

Only three other men aboard had any interest in the matter, another point of superiority Alan held over the ship's complement. They were outcasts. They belonged nowhere. Their time had lagged until they had no hope anywhere. But he was different. Three of the kidnaped space-men who had boarded, perforce, with him, were anxious to get back. The other eleven were apathetic, having reasons of their own not to love

Earth. But with the three Corday found himself in frequent conversation about the joys of Earth.

They forgot top-heavy and turbulent governments, they forgot how hot Newer York could be. They forgot racial squabbles and economic affairs. All Earth was a Paradise in which no faults dwelt that could not be forgotten or forgiven.

Now and then, on watch, studying with Hale or wandering along on some routine job which required little thought, the time equations would rouse to haunt him. They were such precisely accurate things. There was no compromise with Einstein nor with Lorentz.

$$M_v = M_o \sqrt{1 - \frac{V^2}{C^2}}$$

$$T_v = T_o \cdot \sqrt{1 - \frac{V^2}{C^2}}$$

And now and then he would write them idly on a pad, discover what he was doing, look aghast at their value for velocity—seldom less than one hundred eighty-four thousand miles per second, usually more—and with horror rub it out.

He was blinding himself purposely and he half-realized it more than once when he made mistakes in the inbound watch number he set down on his separate log sheet. What he did not realize was that he would carry the same watch number for

four or more consecutive log entries, willfully deluding himself completely as to the number of ship-weeks it was taking homeward bound.

If there was any note of hysteria in his enthusiasm for getting the ship along, he was the last to sense it. He had a cocky swagger about the whole thing, a swagger which yet would not permit his complete calculation of the years which had fled on Earth.

He joined in the singing and he played acey-trays with Hale. He made high-flown plans and was cunning to prepare their carrying out. With desperate psychology he engaged Strange in many a bitter battle over a chess board in sick bay and by whipping at the doctor's vanity with such remarks as, "You know, it's a funny thing about chess—a man feels the disgrace of a beating so keenly I think because there's no luck in it—getting mated is a truthful commentary on a man's actual brains—" and before half the voyage was done he had won back his entire pay and three thousand besides. With his share of the uranium cargo—and he had turned suddenly deaf to a chilling remark of Marby's: "Hope Earth is still using the stuff when we get there. Recall what happened two trips back with that gold?"—Alan would have nearly twenty-five thousand dollars when he was paid off.

And he pushed the speed dial and denied that the faster they went the more Earth time they burned. And he falsified his log to himself. And he felt he was thrusting the *Flea*

Circus home with his own push alone. It was almost a happy time for him. Chica would not have changed, New Chicago would be simply New Chicago. And what a lark he'd have telling his one-time classmates about the tremendous adventure he'd had in the stars. Make good table conversation—casual reference to a lost colony—odds and ends like, "Aboard those ships you can never tell who you're rubbing elbows with. Why on the *King's Lion*—built two thousand years ago, by the way, in some place called Boston—there was a murderer who—" And Chica would beam and bring on the port and his friends would urge him to say more—

"Mr. Corday," said Jocelyn coldly, "if you can spare a moment from your daydreaming, you can rig the starboard gangway. Needs two new sleeves and a brace. We'll be decelerating steadily now so don't spill a man off the side."

"You mean we're almost in?"

"Ten watches, Mr. Corday. Our heaters have been running on Sun particles for two ship-days. Or have you been elsewhere?"

And then, swimming up at them, green and blue and shimmering was the loveliest sight in the heavens—Earth! She came to them like a grand queen, robed in her silvery mists, attended by her page, the Moon. And the Sun Corona flamed beyond her in a fireworks of welcome.

Alan, quivering with impatience, nostrils flared with the emotions

which roared in him, writhed at the senseless precautions of "this fool Jocelyn". For on coming into atmosphere off went Swifty with the Deuce to "Take a scout and locate any possible wars or commotions, taking due care to fly well beyond the possible ranges and accuracies of any new weapons."

For five hours they stood to battle quarters, barely within the outermost atmosphere, moving in an erratic course, all detectors alert.

Senseless precautions, fumed Alan. There'd been no scent of wars when they left and wars could be seen for twenty years ahead. And indeed, the precautions were apparently senseless for at dusk they dropped down to the flats of New Chicago into the racks of the greatest spaceport on Earth.

"All hands muster in the mess hall to receive instructions," said the speakers through the ship.

"Cap'n compliments," said Snoozer, smiling radiantly out of a miraculously clean face, "and would Mr. Corday report to his quarters."

Alan loved the world. He patted Snoozer on the head. "Aye, aye, countess."

He had never been in the quarters before and he did not see them now, being only aware of some old ensigns coiled in the corner and a sense of large space—for these were the admiral's cabins, made for a service long dead.

Jocelyn did not look particularly unkind. "Sit down, Mr. Corday."

Impatiently Alan sat down. He was aware of the warm eyes of Mistress Luck who sat on the transom performing the unwisely act of cleaning Jocelyn's holster and gun.

"We have had several trials, Mr. Corday," said Jocelyn. "In the normal course of the long passage there are many worse."

Alan nodded jerkily, anxious to be off.

"You are very young," said Jocelyn, "and you have a very great deal to learn. *But* with application you may possibly some day make an excellent third in command." He stretched out his legs and began to toss a small desk knife from hand to hand. "You possibly conceive your liberty to have been violated when you came with us and doubtless have many complaints of your treatment aboard. I see you still bear two small scars on your right hand. I am sorry, Mr. Corday, that such measures were necessary. There is much you do not know."

Alan twisted around in the chair, trying to be polite. He could afford politeness now.

What Jocelyn was saying was being said with an effort. But Alan did not notice that. He only saw a man whom he supposed he would never see again and had no wish to know.

"Mr. Corday, I want you to consider that your position at present pay is open until we leave. We will be here ten days more or less. We shift tomorrow; according to my port advices, to the dockyard to have new

drives mounted of an advanced design. We will be in Berthing 197, about a quarter of a mile north of the new warehouses they've built. You will have no trouble finding us."

"I am sure," said Alan, "that I will not see you there. I can conceive of no possible reason why I should."

"There are worse things that could happen to a man," said Jocelyn.

"If there are, sir, I cannot conceive them either."

Jocelyn bit at his lip. He looked fixedly at Alan and then reached into a panel on the desk to draw forth a slip on which he wrote Alan's name and service. Then he pulled from a bag, newly brought aboard, a sheaf of bills and counted out fifteen thousand dollars. To this he added nine thousand, "by authority of draft from Dr. Strange and by reason of a cargo share." He pushed the bills with the discharge toward Alan. They vanished quickly into the side pocket of the tattered white jacket.

"I'd get some new clothes," said Jocelyn. "That is a tenth-class jacket according to its collar insignia. At best you may find some slight changes. I have not investigated anything beyond our safety in landing."

Alan stood up. He gave a brief, formal bow to Mistress Luck and another to Captain Jocelyn.

"You will not reconsider now?" said Jocelyn. And then suddenly, "You may not like what you find, Corday. Believe me, the first re-

turn—" He bit it off and stood up, not offering his hand. Hard bitterness came suddenly back to his handsome face. "I see you won't. Good-by, Mr. Corday."

Alan bowed again and turned on his heel. He found Snoozer in the passageway, eyes wide, stunned. He stopped to drop a bill into her hand with a jocular, "Buy yourself some soap, countess. On me."

But as he paused he caught a glimpse of Jocelyn through the open door. The man had poured himself a stiff drink and into it he was emptying a powder. He drained it off and

threw the glass to the floor where it splintered into a thousand diamonds.

Corday, barely registering the fact, turned away, patted Snoozer on the head and sped aft to the gangway where the sentry saluted. Behind him Alan thought he heard a girl sobbing. Some ship kid without shore leave, he thought. And then he was over the side.

In leaving he noticed that his new-rigged sleeves had operated smoothly and that the gangway reached the precise distance to the ground. And then, without another glance at the ship, hailed a hovering cab.

TO BE CONCLUDED

IN TIMES TO COME

First, to get the record straight: this issue, which contains remarks concerning the November issue, must also contain the statement that we will *not* pull the same gag twice. We have now done something I think most of us had fun with—made up an issue to match a reader's letter. In Times To Come we will not do so again. This is to save readers the effort of dreaming up similar contents pages. It's fun once; once is enough.

With that prediction properly and officially made, we'll go on to more normal predictions. Next issue will, of course, conclude Ron Hubbard's "To The Stars"—with a conclusion you will not have expected, I believe. It's an unusual yarn in that the true plot is entirely developed in the last three paragraphs!

The cover, however—done by Rogers, incidentally—goes to "New Foundations", a story by a writer who has appeared only twice before. But a cover is well earned—it's Wilmar H. Shiras.

It'll be a good issue; tentatively scheduled are stories by H. Beam Piper, H. B. Fyfe, Ray Jones, and an article by Willy Ley. But one of them may, like the Willy Ley article that was scheduled for our November, 1949 issue—it was "Truth and Pravda" by the way—be squeezed over to the following month.

The Editor,

THE PERFECT WEAPON

BY POUL ANDERSON

*To win a war, one must destroy the enemy's ability to resist.
But that doesn't mean you have to destroy the enemy!*

Illustrated by Hicks

Dr. Feodor Karnowsky preferred to work without supervision. When the university to which he was attached as head of the department of physical chemistry accepted a Navy grant for research, he let his assistants do what was required and went on with a program of his own. Presently he was called to task. As token of the gravity of his offense, not only were the head of the college and the Navy liaison officer present, but the president of the university himself.

Karnowsky followed his stomach into the room, nodded an affable good morning, and found a comfortable chair. Not until he had lit one of his atrocious stogies did he ask what the matter was.

"It has . . . ah . . . been brought to my attention—" began the president. He hesitated. You can't put the head of a department, and a Nobel prize winner to boot, on the carpet as if he were an ordinary instructor. His eyes rolled helplessly toward the Navy man.

The officer was not awed by a

string of degrees, certainly not by a Vandyke beard and horn-rimmed glasses and a pot belly. His eyes were cold and his courtesy strained:

"Your department has undertaken critically important researches for the government. In view of your own distinguished record you are a key man in the project—in a sense, it has been built around you. Yet we are given to understand that you are doing nothing on it and are exercising purely nominal supervision. Is that correct?"

"It is," said Karnowsky cheerfully.

The officer's cold manner dropped several degrees further. "And have you any possible excuse for this flagrant negligence?"

"No excuse where none is needed." Karnowsky puffed blue clouds. "But I have excellent reasons, chief of which is that I am engaged on a much more important investigation."

"Indeed?" The Navy man leaned forward. He seemed to have difficulty in maintaining his dangerously soft tone. "And how are you so sure



of that as to set yourself up against the decision of the government and its experts?"

Karnowsky's slightly accented voice retained its good humor. "Because I know a lot more about it than they do," he said.

"That is a dangerous attitude to take, setting yourself superior to authority, especially in these times."

"I think not." Karnowsky took the cigar from his mouth and frowned at its glowing tip. "I would say that it is in such times of tension and hysteria that the superiority of the individual to that witless mass called the public and those smug milkers thereof called 'constituted authority' should be proclaimed especially loudly." He looked into their eyes, one by one. "Am I right or wrong?"

"You are wrong, I regret to say, Dr. Karnowsky," said the president, "and while none of us personally doubt your basic loyalty, still, these are as you say tense times and . . . ah . . . avoiding the appearance of evil—"

"Your research on crystal and fiber structure is necessary for improvement of artillery and rockets." The officer bit his words off and spat them out one by one. "I assume you read the newspapers. Let us not mince words. War is coming, it is only a question of time—short time. The United States has never faced so formidable an opponent before. In spite of your own birth, you are now an American citizen and owe your loyalty to this country."

Karnowsky studied the cigar tip again. "I came here because views

of pacifism and philosophical anarchism were dangerous at home," he said quietly. "Here I found refuge, for which I am grateful. Nevertheless, my opinions on the futility of killing have not changed. I will not willingly be a partner to the murder of several million people, including many of my own relatives, and I will not stand silent when just as many fine American boys are led to the slaughterhouse."

"You can't tell me you're a conscientious objector," snapped the Navy man. "When the contract was being discussed last spring, you said you were on the track of a wholly new weapon. I assume your statement was rhetorical, but—"

"It was meant literally," said Karnowsky. "I wished not at the time to say more, not being certain of my results. And needing funds, I did not oppose the contract." He smiled, an expression which with his pointed gray beard and tufted eyebrows gave him the appearance of a small, plump, amiable satan. "I suppose if you wish, you can clap me in irons for misuse of government money, since I have put most of the funds into my own project. But I think I have kept my promise." He drew deeply on his cigar. "I said I would produce the perfect weapon, and I have. Almost, it is ready."

The three officials exchanged bewildered glances. The president and the Navy officer gave a mental shrug—all scientists were a little mad, and this one had simply gone completely off the beam. But the dean of the en-

gineering college, who was enough of a technical man to appreciate Karnowsky's work without being quite enough of one to understand it, asked with a rising excitement he tried to control: "What is it?"

"The ultimate weapon." Karnowsky stood up. "Gentlemen, why should I waste my time on your stupid little bombs and shells when I am finding out, all by myself and two assistants, a force against which there is no defense—absolutely none? I am a man of peace, gentlemen, too much so to slay thousands and millions of men—no, my weapon will wipe out nations and empires! Feodor Karnowsky goes to war!" And he marched out to the accompaniment of an invisible brass band.

The conference was held in a place whose location was not known even to those who worked there. Hidden somewhere in a remote mountain range it was, its caves and tunnels sinking deep into granite with not a sign from the air of all the bustle and alertness beneath, or the great gleaming monsters which slept and dreamed of the day they would die in flame ardent as the sun's heart, and cities halfway round the world die with them.

The secrecy and the many feet of lead-lined wall, concrete and steel, and dense rock beyond that, led to the choice of Launching Site Seven for meetings such as this. The men who sat around the table in a plain little room were not especially impressive in dress or physique—or

mentality, for that matter, with one or two exceptions—but half the world danced to their tune and the other half crouched in fearful expectancy.

"Time works against us," said the grand marshal. "We have, as outright possession or controlled ally, nearly the whole of Asia, and half Europe as well. Our military organization and our war industry are about as ready as they will ever be. One step more, and the western nations will have to fight—meanwhile they use the truce to build up their own strength."

"So you say strike now?" asked the foreign minister unnecessarily.

"Yes, and strike hard, lest they do it first."

The director of scientific research smiled, a weary lopsided smile with little mirth in it. "Strange," he mused. "For fear of them, we have in these years been forced to swallow an empire that is nothing but another burden for our overloaded people, and for fear of us, they are arming until their economy groans under the strain, and they lay aside those institutions they claim to be defending—and both sides make ready for a war they know will ruin them."

"Only one side need be ruined, if the other hits hard enough," said the grand marshal grimly. "We may escape with being only half ruined."

"There is, too, the matter of war aims," said the premier, who was also the dictator. "Their ideology cannot, for the sake of the future as well as ourselves, be permitted to over-

come ours—or even to coexist for long."

The minister of the interior nodded. "The situation is volcanic. Why deny it, here among ourselves, that the bulk of the people grow increasingly restless under the inevitable burdens of the great transition? If their energies are not turned against the outside, they will sooner or later be directed against us. But when the alien powers are gone, and only we are left, reaction will have nothing to cling to and will die."

"Rhetoric!" snorted the grand marshal. And to the dictator: "Since we agree, then, that it is to be war, and that we are forced to strike first, the discussion resolves to one of practical military procedure. The master plan has, as you know, long been ready, and it should not take many days to settle the details and get all units ready for action."

Dr. Feodor Karnowsky demanded an audience with the President. He demanded it with such profane and noisy insistence that he actually got it. The couple of weeks he had to spend going through various military and bureaucratic channels raised his blood pressure and assailed many official ears with the waterfront oaths of several languages, but in a way they proved worth it. Being forced to give demonstrations and specific facts along every stage of the way violated his sense of the dramatic unities, but he was thereby enabled to awe sufficiently many important people to insure a conference long

enough and well enough attended by top brass to be effective.

It was not at the White House; but the unspectacular country estate to which he was driven had a definite edge in comfort over the summer-broiling, disaster-crying streets of Washington. He went in a big black car, with secret service men all around him, and though he fumed at being held incommunicado he enjoyed every minute of it.

They went to business with unusual speed in that long cool room where Robert E. Lee had once sat waiting for news from the battle-front, for the menace hanging over them was held by a thread at which time gnawed like a rat. To the ominous silence brooding over the world, the newspapers added an undercurrent of madness. Rioting in New York, plummeting grain exchange in Chicago, exodus from London, mass revivals in Los Angeles and mass drinking and dancing in Paris. Martial law declared in Pennsylvania, secession of three Texas counties, collapse of the Belgian cabinet, all reserves in every country called up. Men do strange things when their nerves break—ultimately, in an ecstasy of blind panic, they cut loose with every weapon they have. No matter if they themselves get wiped out—one way or another, the suspense will be over.

Even so, the President—who was not a theatrical figure in any sense, but simply a gaunt overworked man haggard under the dreadful load of a collapsing world—took time for

wonder. "I can scarcely believe it," he said. "The inspiration of one man, and now this—it is too much like a story."

"Entirely too much." The voice of the secretary of defense was grim. "However, important this may be, it is certainly not decisive. War is too complex a business to be settled by something as simple as . . . as—"

"As a gas which catalyzes an oxidation reaction causing certain types of cellulose fiber to lose cohesion?" Karnowsky raised his Mephistophelean eyebrows. "Oh, but they are. Modern civilization is such a complex of interdependent units that the failure of any one of the more important leads to the stopping of the whole machine. Millions hunger in the midst of plenty because certain stock exchange figures remain low. A strike in coastwise shipping, and the transport system of the east coast dies of oil starvation. A plague among Australian sheep, and the London dockhand shivers for need of warm clothing. Oh, I tell you that when you strike at the substance of which modern civilization may be said to be built, then you bring the collapse of everything sponsored by the civilization."

"But how do you know—" A British representative fumbled for words. "You say it is a chemically simple substance, this gas, easy to produce in large quantity—how do you know *they* won't find it out . . . may not, at this moment, be preparing to turn it against us?"

"It was a somewhat improbable

ASTOUNDING SCIENCE-FICTION

laboratory accident that started me on this line of research," said Karnowsky, "and even so it took all my energy and thought for many months to isolate the gas and work out its structural formula. If I, who won the Nobel prize for work in matter structure, just barely found this out—and had a free hand—how do you expect the poor politician-ridden scientists over there to look up from their assigned tasks long enough to investigate a small anomaly in an obscure organic reaction? Oh, it could be duplicated in time, certainly—but if you use the weapon properly, there won't be time!"

"I still say—" insisted the secretary of defense.

"Never mind what you still say!" exploded Karnowsky. "After all, it is not as if the use of this weapon in any way interfered with your other projects. All you have to do is send rockets which will blow up in the lower atmosphere over key centers, releasing the gas. It is denser than air, so it will settle on the targets, and as it is a catalyst rather than a reactant only an almost infinitesimal concentration will be needed to start the oxidation—which, once under way in a given piece of material, proceeds without even requiring further catalyst."

"But if—" The President paused, then said slowly: "If it is as you say—and it seems beyond belief—then the regions where the gas is released are doomed to perpetual—"

"No, no, no!" shouted the chemist. "How many times must I say

that not only is the gas dissipated slowly through the atmosphere—you will have to send fresh rockets from time to time—but it is an unstable molecule with a half-life of about a year. The effects are definitely finite, which is another characteristic of the absolute weapon."

He nodded his head and repeated happily: "The absolute weapon—cheap and easy to make in any desired quantity, irresistible—and utterly terrible!"

The dictator realized that he could scarcely hope to keep the general location of his important bases and launching sites a dead secret. Western intelligence was quite efficient, and knew just as well as his own how to make use of disgruntled officials and power-hungry insignificants. The observatories established two years back on the Moon would also reveal any unusual activity in supposedly desolate lands.

But the territory was immense, and the secret of location was good for any distance less than a hundred miles or so. Only radioactive gases would be effective against so large a target, and their concentration would be too slight for much damage.

The dictator was quite prepared to lose his great cities. It would be an empty sort of gesture for the Americans and their allies to destroy them, since his own real strength had been moved into those well-enough-hidden bases and underground sites. They could much less well afford to dispense with their cities, not hav-

ing been able to decentralize by simple ukase—but lose them they would, in a sudden blow set for two days hence.

The dictator puffed his pipe, alone in his office under a certain mountain. He felt, in a nominal way, sorry for all those who must die. But there was no help for it.

With cities gone in a radioactive glare, the war would settle down to a long and bitter struggle. And in the end it would be decided as wars always had been decided and always would be, regardless of all the fancy weapons and the lab-smocked men who fathered them—by infantry, the poor slogging infantry fighting its way inch by bloody inch, bleeding and dying and never letting go, but pushing on until it either held all the enemy territory or there was a surrender. Too bad, but there it was, and the Eurasian heartland—and Africa, when they had that—bred infantrymen faster than the Americas. Ten years, twenty years—however long it took, the outcome was inevitable.

Alarms screamed, and the dictator sat up in his chair— Had . . . oh, no! . . . if *they* had struck first—

The alarm screamed and screamed. The dictator half started from his seat, then relaxed, forcing himself to calm with an effort that twisted his nerves. He bit his pipestem savagely. If they had hit—well, that really made no difference, and in fact it made propaganda material such as the sloganers dreamed of, but—he

had an orderly mind, and this annoyed him.

The communicator on his desk chattered with the voice of his aide: "Stratospheric rockets, sir. They were first detected on explosion, about three miles from the ground."

"Damage?"

"That . . . that's the thing we don't understand, sir. They seemed to have held just enough dynamite or whatever it was—not atomic at all—just enough to open the warheads. And the wind should have swept any gases past here by this time, sir, but the Geiger counters show no increase in radioactivity at all, sir—" The voice trailed off in puzzlement.

"Chemical poisons?"

"Apparently not, sir. The chemists report no reaction in tests for the usual ones, and they say the rockets couldn't possibly have held enough for there to be an effective concentration here. We haven't even sealed off the ventilators, sir . . . should we?"

"No . . . no, I suppose not." The dictator looked blankly into the communicator's impassive face. Strange, thought one corner of his mind, strange that the machine could look so completely untroubled when so agitated a voice was coming out of it.

"Could they have been some of ours, perhaps, sir?"

The dictator shut off the phone. He didn't answer the question because he didn't know, which is something an absolute ruler can hardly afford to reveal.

But the instrument was persistent.

It broke its silence at once with reports of unidentified rockets exploding harmlessly, apparently purposelessly, above three other bases. And then the reports came thick and fast, until the dictator jumped from his seat and yelled that he couldn't be bothered any more.

He sat down again, trembling ever so faintly. It must be an attack. Certainly it was no home project. But—why?

Pamphlets, maybe, to incite revolt in the base personnel? No, that made no sense—nothing did. It might be some new weapon that was a fiasco—but who would launch anything on that scale without being certain it would be effective?

He relaxed his wire-taut body, concentrating grimly until the quivering muscles eased. After all, he had work to do. Piled on his desk was a mountain of documents, ultra-secret—plans, orders, reports, protocols, the paper armor worn by the modern Alexanders who fought with pens. A scribbled signature on the document in his hand, for instance, meant the reorganization of three bomber commands and . . . and—

As he looked at it, the paper turned brown in his fingers. He cast it from him with a reflex jerk of sheer astonishment, and it crumbled in midair.

He sat before a desk piled high with brown ash.

"Matter?" snarled the grand marshal. "You ask me what is the matter?" In his rage he quite forgot the

deference due his chief. He stamped up and down before the dictator's desk with his boots slamming out a rhythm of caged tiger pacing.

"I do." The dictator's eyes were bleak. "Here it is eight days since the dastardly American attack and your armies have not yet reached their European bases. Instead, mutiny and desertion and witless blundering through empty countrysides—I need not tell you the penalty of being an unsuccessful leader."

"How—" The marshal gobbled for lack of oaths. Religious training, his mind gibbered, would have had that much advantage. He fought himself to a semblance of calm.

"How," he asked thinly, "can a war be fought without records, orders, requisition forms, rolls, inventories—with even the paper wrappings of field rations? When every scrap of paper crumbles wherever the new bombs explode—" He shook his fists into the air. "The . . . the traitors! No soldier has any papers any more, identification forms, records on file—he is an anonymous! And precious few civilians have them. The men simply desert. Who can prove an escaped soldier is not an indispensable factory worker?"

"Who can run a factory when the blueprints, among all other records, no longer exist?" The minister of production wiped his brow. He was a badly frightened man. "Engineers don't carry many figures or plans in their heads, you know! How can

we run railroads without timetables? How can we know what we have?"

The dictator's wrath was still directed at the grand marshal. "How do you explain the bombardment fiasco?" he inquired.

The man shrugged star-gleaming shoulders. "We fired off plenty of long-range rockets, of course," he said. "None of them hit anything important. A city is just too small a target at a distance of a thousand miles or more when you have no range data, no logarithms, not even scratch paper for calculations."

"Nevertheless, the counterattack gave the westerners an excuse to declare war. They can hit us, you know. That they haven't done so, or indeed made any aggressive move other than their cursed gas-bombing, indicates a supreme confidence."

"A well justified one." The marshal's voice was low and bitter.

"When we have the world's mightiest land army? When our submarines can go all over the world? When our bombers can drop death on their cities, like birds laying eggs? Let us not be ridiculous. This is a formidable new weapon, but it is not invincible."

"I wonder." The director of research rubbed a weary hand over his eyes. He had not slept much, in the frantic scramble of laboratories suddenly deprived of those accumulated centuries of work which are known as reference books. "I wonder, generalissimo. We can make a few blind thrusts, yes, but how can we possibly co-ordinate them? How can

we control men without records of their lives? Only by setting half the country to ceaseless watching of the other half, and we don't have that many men of unquestionable loyalty. How can we stir up any kind of fighting spirit in the weary people except by the floods of propaganda—*printed* propaganda—on which we have built our power? Our only long-range communications are now telephone and radio, both badly overloaded, and wholly inadequate for the transmission of detailed information. Every day the bombs wipe out, not lives and homes, which would unite our people with us in a bond of common suffering, but—paper."

He smiled faintly. "Comical, isn't it?" he said. "No ration books, no identity cards, no newspapers, no streetcar transfers, no paper money or instruments of credit—a fact which alone is plunging our economy into chaos. The people suffer not death and disaster, but annoyance and dislocation—and the ghastly fear that soon the Americans will really get down to business. Rioting, desertion, sedition—and no real way of keeping track of anyone when he is out of sight."

The dictator's eyes narrowed. "That is defeatist talk," he said slowly.

"Why not? We are defeated."

The dictator pressed a button. Three uniformed guards entered the council chambers. He pointed a finger at the director of scientific re-

search. "Take that man out and shoot him," he said.

"Now hold on—" The grand marshal bent over the desk, his face taut and pale. "I countermand that order."

"*You do—*"

"Yes. If you once get to liquidating your best men, there will soon be no one left. None of us here wants to die in a hopeless cause. You will listen to reason or there will be a new head of state." The grand marshall smiled humorlessly. "The cabal is well organized, even on such short notice. As our friend said—you can no longer keep track of everyone's actions!"

Wine always put Dr. Karnowsky in a mood for philosophical generalities. He leaned back in an armchair wide enough even for him and eyed his third glass appreciatively. "The outcome, as I said, was inevitable," he declared. "There is no defense against an absolute weapon—*ex definitione*."

"It's probably the first time an empire has fallen inside of two weeks, with hardly any loss of life on either side," answered the President. He felt that after the hectic days of organization for an unexpected victory he was entitled to a little private relaxation with his White House guest. "Actually, the occupation is going to be a heck of a lot tougher than the war. But we have every hope of succeeding, and of getting, at long last, a really workable world or-

ganization." He shuddered a little. "We have to! When I think of the howling chaos over there— That gas is more like a plague than a weapon. But a nonfatal plague, fortunately."

"It is a weapon," insisted Karnowsky. "The reason you cannot see that, I think, is the modern notion of war as mass murder. But you must remember Clausewitz's definition of war as . . . let me see . . . it goes something like the continuation of politics by other than diplomatic means. And a weapon is an instrument to win wars—in this case, by eliminating the enemy as a nation, not as a people. When a country suffers everything from social embarrassment to the loss of currency and records, it simply goes to pieces."

"I feel—afraid. Another war—"

"The weapon," said Karnowsky, "has ended the trend toward centralization. A totalitarian state is based on complete control of the individual, and is in that sense the ultimate end-product of civilization. But such control is hardly possible without records, propaganda, endless bureaucracy—which requires paper! In future wars, Mendeleef forbid there should be any, victory will go to the less tightly organized nation—to free men."

He sipped his wine and there was a sadness in his eyes. "They call me world savior and all that—deservedly so," he mused. "Yet—I wonder. I shall have to answer heavily to my bibliophilic conscience—"

THE END

THE SOUND

BY A. E. VAN VOGT



When something is really complex, a child must grow up with it to handle it. So were the Children of the Ship. But it wasn't intended that a kid should have to handle that deadly menace . . .

Illustrated by Brush

"You're wanted on the video," said Exchange.

Craig clicked on his machine. "Yes?" he said, before the picture could form.

"It's me, George." The woman whose face grew onto the videoplate looked agitated. "George, the Play Square just called me. Diddy has gone out to look for the sound."

"Oh," said George.

He studied her image. Hers was normally a good-looking face, clear-skinned, well-shaped, crowned with beautifully coiled black hair. At the moment it was not normal. Her eyes were widened, her muscles tensed, and her hair slightly displaced.

"Veda," he said sharply, "you're not letting it get you."

"But he's out there. And the

whole area is said to be full of Yevd spies." She shuddered as she spoke the name of the great enemy.

"The Play Square let him go, didn't it? It must think he's ready."

"But he'll be out all night."

Craig nodded slowly. "Look, darling, this had to happen. It's part of the process of growing up, and we've been expecting it since his ninth birthday last May."

He broke off. "How about you going out and doing some shopping? That'll take your mind off him for the rest of the afternoon anyway. Spend"—he made a quick calculation, took another look at her face, and revised the initial figure upward—"five hundred dollars. On yourself. Now, good-bye, and don't worry."

He broke the connection hastily, and climbed to his feet. For a long time he stood at the window staring down at The Yards. From his vantage point he could not see the "Way" or the ship; they were on the other side of the building. But the fairyland of streets and buildings that he could see enthralled him now as always. The Yards were a suburb of Solar City, and that massive metropolis in its artificial tropical setting was a vision that had no parallel in the human-controlled part of the Galaxy. Its buildings and its parks extended to every hazy horizon.

He drew his gaze back from the distance, back to the city proper of The Yards. Slowly, he turned from the window. Somewhere down there his nine-year-old son was ex-

ploring the world of the sound. Thinking about that or about the Yevd wouldn't do either Veda or himself the slightest good.

He picked up the microfilm of a ninety-foot square blueprint, slipped it into a projector, and began to study it.

By the time the sky grew dark, Diddy knew that the sound never ended. After wondering about it for his whole lifetime, or so it seemed, that was good to know. He'd been told that it ended somewhere "out there"—vaguely. But this afternoon he'd proved for himself that, no matter how far you went, the sound remained.

The fact that his elders had lied to him about that did not disturb Diddy. According to his robot teacher, the Play Square, parents sometimes fibbed to test a fellow's ingenuity and self-reliance. This was obviously one of the fibs, which he had now disproved.

For all these years, the sound had been in his Play Square, and in the living room whether he was silent or trying to talk, and in the dining room making a rhythm out of the eating noises of Mom and Dad and himself—on those days that he was permitted to eat with them. At night the sound crept into bed with him, and while he slept, even in his deepest sleep, he could feel it throbbing in his brain.

Yes, it was a familiar thing, and it was natural that he'd tried to find out if it stopped at the end of first

one street and then another. Just how many streets he'd turned up and into and along, whether he'd gone east or west or south or north, was no longer clear. But wherever he'd gone, the sound had followed him. He had had dinner an hour ago at a little restaurant. Now it was time to find out *where* the sound began.

Diddy paused to frown over his location. The important thing was to figure out just where he was in relation to The Yards. He was figuring it by mentally calculating the number of streets between Fifth and Nineteenth, H and R, Center and Right, when he happened to glance up. There, a hundred feet away, was a man he'd first seen three blocks and ten minutes back.

Something about the movement of the man stirred a curious, unpleasant memory, and for the first time he saw how dark the sky had become.

He began to walk casually across the road, and he was glad to notice that he was not afraid. His hope was that he would be able to get by the man, and so back to the more crowded Sixth Street. He hoped, also, that he was mistaken in his recognition of the man as Yevd.

His heart sank as a second man joined the first, and the two started to cross the street to intercept him. Diddy fought an impulse to turn and run. Fought it, because if they were Yevd, they could move ten times as fast as a grown man. Their appearance of having a humanlike body was an illusion which they could create

by their control of light. It was that that had made him suspect the first of the two. In turning the corner, the fellow's legs had walked *wrong*. Diddy could not remember how many times the Play Square had described such a possibility of wrongness, but now that he had seen it, he realized that it was unmistakable. In the daytime, the Yevd were said to be more careful with their illusions. Just for a moment, being virtually alone on a dark corner, the Yevd had allowed the human image to blur.

"Boy!"

Diddy slowed, and looked around at the two men, as if seeing them for the first time.

"Boy, you're out on the streets rather late."

"This is my exploring night, sir," said Diddy.

The "man" who had spoken reached into his breast-pocket. It was a curious gesture, not complete, as if in creating the illusion of the movement, he hadn't quite thought through the intricacies of such an action. Or perhaps he was careless in the gathering darkness. His hand came out, and flashed a badge.

"We're 'Yard' agents," he said. "We'll take you to the 'Way'."

He put the badge back into his pocket, or seemed to, and motioned towards the brightness in the distance. Diddy knew better than to resist.

Out of the dark distance of space the Yevd had come more than two

hundred years before. Like the black reaches through which their ships plunged from their multitudinous worlds in the central mass of the Galaxy, they made an uneasy impression on the minds of men.

In the beginning, they did not try to look human, and there was no suspicion that they could control light and related energies with their bodies. Then one day, accidentally, a "man" was blasted while rifling the vault of the Research Council. Dead, the man-image faded, and there, sprawled on the marble floor was the dark, rectangular, elongated shape with its score of resticulated, pistonlike arms and legs.

On that day, more than two centuries before, a dismayed government acted swiftly and secretly. The fleet was mobilized while the ramifications of the plot were explored. Armed helicars flew along the streets of every city. The probing beams of radar machines reflected and silhouetted the real bodies of the Yevd—though it was afterwards discovered that the radar method was successful only because of the element of surprise. The Yevd had become careless because they were not suspected, and maintained their illusion only on the light level visible to human beings. Because of that error, nearly a million of them were blasted on Earth alone, and that broke the fifth column there.

Warnings had meanwhile been flashed to all the man-inhabited planets. There, also, prompt action averted disaster. Altogether thirty-

seven million Yevd were killed.

Thereafter, Earth and Yevd ships fought each other on sight. The intensity of the war waxed and waned. There were several agreements, but at no time did these actually stop the war. To some extent they stopped Yevd ships from coming into man-controlled space and vice versa. The most recent agreement included an exchange of ambassadors, but five years before a Yevd colonizing expedition had occupied a star system ninety-odd light-years nearer Earth than any other sun in their galactic empire. When asked to explain the seizure, the Yevd ambassador had stated that the "action is a normal incident in the expansion of a great power, and is not directed at anyone." He was promptly handed his papers, and six months later the sound began.

The Yevd were a hydrocarbon-fluorine-oxygen life form, tough of muscle and skin, physically stronger than man, immune to ordinary poisons and corrosives. Their control of light gave them an additional advantage; and the combination of enormous capability and unceasing aggressiveness had finally decided the United Governments to make a major counterattack.

The big ship was designed to do the job.

Craig opened the door of his apartment for the two police officers shortly after dinner. Though they wore plain clothes, he recognized them instantly for what they were.

"Mr. Craig?" one of them asked.

"Yes?"

"George Craig?"

He nodded this time, aware in spite of having just eaten of an empty sensation.

"You are the father of Diryl Dexter Craig, aged nine?"

Craig took hold of the door jamb. "Yes," he mumbled.

The spokesman said: "It is our duty, as required by law, to inform you that at this moment your son is in the control of two Yevd, and that he will be in grave danger of his life for some hours to come."

Craig said: "I'm . . . not . . . sure . . . I . . . understand."

Quietly, the officer described how Diddy had been taken over on the sidewalk. He added, "We've been aware for some time that the Yevd have been concentrating in Solar City in more than usual numbers. Naturally, we haven't located them. As you may know, we estimate their numbers on the basis of those we do spot."

Craig hadn't known, but he said nothing. The other continued:

"As you probably also know, we are more interested in discovering the purpose of a Yevd ring than in capturing individuals. As with all Yevd schemes in the past, this one will probably prove to be extremely devious. It seems clear that we have only witnessed the first step of an intricate plan. But now, are there any questions?"

Craig hesitated. He was acutely conscious of Veda in the kitchen putting the dinner dishes into the

dish washing machine. It was vital that he get these policemen away before she found out what their mission was. Yet one question he had to ask.

"You mean, there'll be no immediate attempts to rescue Diddy?"

The officer said in a firm voice: "Until we have the information we want, this situation will be allowed to ripen. I have been instructed to ask you not to build up any hopes. As you know, a Yevd can actually concentrate energy of blaster power with his cells. Under such circumstances, death can strike very easily."

He broke off, "That's all, sir. You may call from time to time if you desire further information. The police will not communicate with you again on their own initiative."

"Thank you," said Craig automatically.

He closed the door, and went with mechanical stolidity back to the living room. Veda called from the kitchen:

"Who was it, darling?"

Craig drew a deep breath. "Somebody looking for a man named George Craig. They got the right name but the wrong man." His voice held steady for the words.

"Oh!" said Veda.

She must have forgotten the incident at once, for she did not mention it again. Craig went to bed at ten o'clock. He lay there, conscious of a vague ache in his back, and a sick feeling at the pit of his stomach. At one o'clock he



was still wide awake.

He mustn't offer any resistance. He must make no attempt to frustrate any plans they might have. For years the Play Square had emphasized that. No young person, it had stated categorically, should consider himself qualified to judge how dangerous any particular Yevd might be. Or how im-

portant the plan of a Yevd spy ring.

Assume that something was being done. And await whispered instructions.

Diddy was remembering all these things, as he walked between the two Yevd, his short legs twinkling as he was hustled along faster than his normal pace. He was heartened by the fact that they had still not let him know their identity. They

were still pretending.

The street grew tremendously brighter. Ahead, he could see the ship silhouetted against the blue-black sky beyond. All the buildings that crowded the "Way" were giving off the sunlight they'd absorbed during the day. The hundred story administration building glowed like a jewel in the shadow of the towering ship, and all the other buildings shone with an intensity of light that varied according to their sizes.

With Diddy in tow, the two Yevd came to Cross 2. The "Way" itself was Cross 1.

They walked across the street, and came to the barrier. The two Yevd paused in front of the eight foot wide band of fluted metal, with its constant suction effect, and stared down at the open ventilators.

Two-centuries before, when Yevd and human first made contact, there had been concrete walls or electrified barbed wire fences around defense plants and military areas. Then it was discovered that Yevd could deflect electric current, and that their tough skin was impervious to the sharp bite of barbed wire. Concrete was equally ineffective. The walls had a habit of crumbling in the presence of certain Yevd-directed energies. And, among workmen who arrived to repair them was usually a Yevd who, by a process of image transference and murder, made his way inside. Armed patrols were all too frequently killed to a man, and their places taken by

Yevd light-wave images.

The air suction type of barrier was only a few generations old. It extended all the way around The Yards. Human beings who walked through it scarcely noticed it. A Yevd who tried to penetrate it died within about three minutes.

It was one of Man's top secrets.

Diddy seized on the hesitation of his two escorts. "Thanks for bringing me this far," he said, "I'll be able to manage now."

One of the "men" laughed. It was a wonderfully authentic laughter, considering that it came from a sound box imbedded in the Yevd's shoulder muscles. The creature said:

"You know, kid, you look like a pretty good sport. Just to show you that our hearts are in the right places, how'd you like to have a little fun—just for a minute?"

"Fun?" said Diddy.

"See that barrier there?"

Diddy nodded.

"Good. As we've already told you, we're security police—you know, anti-Yevd. Of course, we've got the problem on our minds all the time. You can see that, can't you?"

Diddy said that he could. He wondered what was coming.

"Well, the other day my friend and I were talking about our job, and we figured out a way by which a Yevd might be able to cross that barrier. It seemed so silly that we thought we ought to test it before we reported it to the top brass. You know what I mean. If it turned out

wrong, why, we'd look foolish. That's the test we want you to help us make."

No young person . . . must . . . attempt to frustrate any plans . . . of a Yevd spy ring. The command, so often given by the Play Square, echoed in Diddy's mind. It seemed dreadfully clear that here was special danger, and yet it was not for him to judge, or oppose. The years of training made that automatic now. He wasn't old enough to know.

"All you've got to do," said the Yevd spokesman, "is walk between these two lines across the barrier, and then walk back again."

The lines indicated were a part of the pattern of the fluted arrangement of the ventilators. Without a word of objection, Diddy walked across to the other side. Just for a moment, then, he hesitated, half minded to make a run for it to the safety of a building thirty feet away. He changed his mind. They could blast him before he could go ten feet.

Dutifully, he came back, as he had been told to do.

A score of men were coming along the street. As they came near, Diddy and the two Yevd drew aside to let them pass. Diddy watched them hopefully. *Police?* he wondered. He wanted desperately to be sure that all that was happening was suspected.

The workmen trooped by, walked noisily across the barrier, and disappeared behind the nearest building.

"This way, kid," said the Yevd. "We've got to be careful that we're not seen."

Diddy wasn't so sure of that, but he followed them reluctantly into the dark space between two buildings.

"Hold out your hand."

He held it out, tense and scared. *I'm going to die*, he thought. And he had to fight back the tears. But his training won out, and he stood still as a needle-sharp pain jabbed his finger.

"Just taking a sample of your blood, kid. You see, the way we look at it, that suction system out there conceals high-powered air hypodermics, which send up bacteria to which the Yevd are vulnerable. Naturally, these air hypodermics send up their shots of bacteria at about a thousand miles an hour, so fast that they penetrate your skin without you feeling them or leaving a mark. And the reason the suction ventilators keep pulling in so much air is to prevent the bacteria from escaping into the atmosphere. And also the same culture of bacteria is probably used over and over again. You see where that leads us?"

Diddy didn't, but he was shocked to the core of his being. For this analysis sounded right. It *could* be bacteria that were being used against the Yevd. It was said that only a few men knew the nature of the defense projected by the innocent-looking barrier. Was it possible that at long last the Yevd were finding it out?

He could see that the second Yevd

was doing something in the shadowy region deeper between the two buildings. There were little flashes of light. Diddy made a wild guess, and thought: *He's examining my blood with a microscope to see how many dead anti-Yevd bacteria are in it.*

The Yevd who had done all the talking so far said:

"You see how it is, kid, you can walk across that barrier, and the bacteria that are squirted up from it die immediately in your bloodstream. Our idea is this: There can only be one type of bacteria being sent up in any one area. Why? Because, when they're sucked down, and sent back to the filter chambers so they can be removed from the air and used again, it would be too complicated if there was more than one type of bacteria. The highly virulent bacteria that thrive in a fluorine compound are almost as deadly to each other as to the organism which they attack. It's only when one type is present in enormously predominant amounts that it is so dangerous to the Yevd. In other words, only one type at a time can kill a Yevd."

"Obviously, if a Yevd is shot full of immunization against that particular type of bacteria—why, kid, he can cross the barrier *at that point* as easily as you can, and he can then do anything he wants to inside The Yards. You see, how big a thing we're working on."

He broke off, "Ah, I see my friend has finished examining your blood. Wait here a moment."

He moved off to where the other Yevd was waiting. There were tiny flashes of light from the darkness, and Diddy remembered tensely that Yevd communicated with each other by light beams and light energies that operated directly from a complex interrelation of organic prisms, lens, mirrors and cell transformers.

The conference, whatever its nature, lasted less than a minute. The Yevd came back.

"O.K., kid, you can scoot along. Thanks a lot for helping us. We won't forget it."

Diddy could not believe his ears for a moment. "You mean, that's all you want from me?" he said.

"That's all."

As he emerged from the dark space between the two buildings, Diddy expected somehow that he would be stopped. But, though the two Yevd followed him out to the street, they made no attempt to accompany him as he started across it toward the barrier. The spokesman called after him:

"There's a couple of other kids coming up the street. You might join them, and the bunch of you can look for the sound together."

Diddy turned to look, and as he did so, two boys came darting towards him, yelling: "Last one over is a pig."

They had the momentum, and they were past him in a flash. As he raced after them, Diddy saw them hesitate, turn slightly, and then cross the barrier at a dead run over the ventilators which he had tested for

the two Yevd researchers.

They waited for him on the other side.

"My name is Jackie," said one.

"And mine is Gil," said the second one. He added, "Let's stick together."

Diddy said: "My name is Diddy."

Neither of the two boys seemed to think the name unusual.

There were separate sounds, as the three of them walked, that drowned out *the* sound. Discordant noises. Whirring machines. An intricate pattern of clangorous hammerings. Rippling overtones from the molecular displacement of masses of matter. A rubber-wheeled train hummed towards them over the endless metal floor that carpeted The Yards, and paused as its electronic eyes and ears sensed their presence. They stepped out of the way, and it rushed past. A line of cranes lifted a hundred ton metal plate onto an antigravity carrier. It floated away lightly, airily, into the blazing sky.

Diddy had never been on the "Way" at night before, and it would have been tremendously exciting if he had not been so miserable. The trouble was, he couldn't be sure. Were these two companions Yevd? So far they had done nothing that actually proved they were. The fact that they had crossed the barrier at the point where he had tested it for the two Yevd could have been a coincidence.

Until he was sure, he dared not

tell anyone what had happened. Until he was sure, he would have to go along with them, and even if they wanted him to do something, co-operate with them. That was the rule. That was the training. He had a picture in his mind of scores of images of boys crossing the barrier at the test point. Even now they would be moving along the "Way", free to do as they pleased.

The universe around the "Way" shivered with a concatenation of sounds. But nowhere that Diddy looked, no doorway into which he peered, no building that he wandered through with wide, fascinated eyes—in spite of the presence of his companions—nowhere was there a sound that did not quickly fade away as he moved on.

Not once did they come to anything that even faintly resembled a barrier type ventilator. If there was any threat to wandering Yevd, it was not apparent. Doors stood wide open. He had hoped in a vague fashion that the atmosphere of some closed room would be deadly for the enemy and not for him. He found no such rooms.

Worst of all, there was no sign of a human being who might conceivably protect him from the Yevd, or even suspect their presence. If only he could be sure that these two boys were Yevd. Or weren't. Suppose they carried some deadly weapon capable of causing tremendous damage to the ship?

They came to a building half a mile square. And Diddy grew sud-

denly hopeful. His companions offered no objection as he walked through a huge door onto a causeway. Below them was depth. From the causeway Diddy looked down at a dimly glowing world of huge, cube-like structures. The top of the highest cube was at least a quarter of a mile below the causeway, and it was blocked off by floor after floor of plastic, so limpidly transparent that only a gleam here and there revealed that there were many layers of hard, frustrating matter protecting the world above from the enormous atomic piles in that colossal powerhouse.

As he approached the center of the causeway, Diddy saw—as he had a few moments before hopefully expected—that there was somebody in a little transparent structure that jutted out from the metalwork. A woman, reading. She looked up as the three of them came up, Diddy in the lead.

"Searching for the sound?" she asked in a friendly tone. She added, "Just in case you don't know—I'm a Sensitive."

The other boys were silent. Diddy said that he knew. The Play Square had told him about Sensitives. They could anticipate changes in the flow of an atomic pile. It had, he recalled, something to do with the way the calcium content in their blood was controlled. Sensitives lived to a very old age—around a hundred and eighty—not because of the jobs they had but because they could respond

to the calcium rejuvenation processes.

The memory was only a background to his gathering disappointment. Apparently, she had no way of detecting the presence of a Yevd. For she gave no sign.

He'd better keep pretending that he was still interested in the sound, which was true in a way. He said: "Those dynamos down there would make quite a vibration, I guess."

"Yes, they would."

Diddy was suddenly intent, impressed but not convinced. "Still, I don't see how it could make the big sound."

She said: "You all seem like nice boys. I'm going to whisper a clue into your ears. You first." She motioned to Diddy.

It seemed odd, but he did not hesitate. She bent down. "Don't be surprised," she whispered. "You'll find a very small gun under the overlapping edge of the metal sidewalk underneath the ship. Go down escalator seven, and turn right. It's just on this side of a beam that has a big H painted on it. Nod your head if you understand."

Diddy nodded.

The woman went on swiftly. "Slip the gun into your pocket. Don't use it until you're ordered to. Good luck."

She straightened. "There," she said, "that should give you an idea."

She motioned to Jackie. "You next."

The stocky boy shook his head. "I don't need no clues," he said. "Be-

sides, I don't want nobody whispering anything to me."

"Nor me either," said Gil.

The woman smiled. "You mustn't be shy," she said. "But never mind. I'll give you a clue anyway. Do you know what the word 'miasm' means?" She spoke directly to Jackie.

"Mist."

"That's my clue, then. Miasm. And now you'd better be getting along. The sun is due up a few minutes before six, and it's after two o'clock now."

She picked up her book and, when Diddy glanced back a few minutes later, she looked as if she was a part of the chair. She seemed scarcely alive, so still she was. But because of her, he knew. The situation was as deadly as he had suspected. The great ship itself was in danger.

It was towards the ship that he headed.

Craig wakened suddenly to the realization that something had roused him, and that accordingly he must have slept. He groaned inwardly, and started to turn over. If he only could sleep through this night.

With a start he grew aware that his wife was sitting on the edge of the bed. He glanced at his illuminated watch. It was 2:22 a.m.

Oh, my gosh, he thought, I've got to get her back to bed.

"I can't sleep," said Veda.

Her voice had a whimper in it, and he felt sick. For she was worrying like this about nothing. He pre-

tended to be very thoroughly asleep.

"George."

Craig stirred, but that was all.

"George."

He opened one eye. "Darling, please."

"I wonder how many other boys are out tonight."

George turned over. "Veda, what are you trying to do—keep me awake?"

"Oh, I'm sorry. I didn't mean to." Her tone was not sorry, and after a moment she seemed to have forgotten she'd spoken the words. "George."

He did not answer.

"George, do you think we could find out?"

He'd intended to ignore further conversation, but his mind started to examine the possible meaning of what she'd said. He grew astonished at the meaninglessness of her words, and woke up.

"Find out what?" he said.

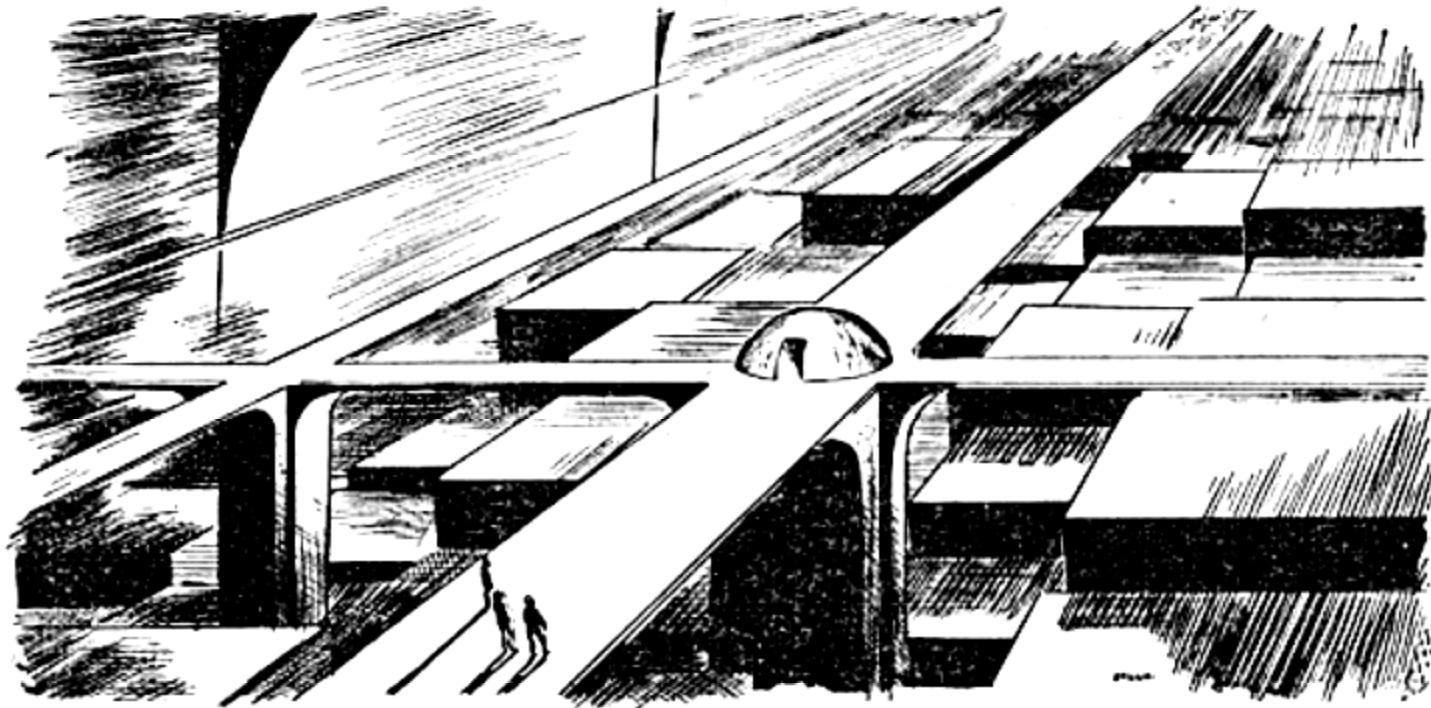
"How many there are?"

"How many what?"

"Boys—outside tonight."

Craig, who was weighed down by a far more desperate fear, sighed. "Veda, I've got to go to work tomorrow."

"Work!" said Veda, and her voice had an edge in it. "Don't you ever think of anything but work? Haven't you any feelings?" Craig kept his silence, but that was not the way to get her back to her bed. She went on, her voice, several tones higher. "The trouble with you men is that you grow callous."



"If you mean by that, am I worried—no, I'm not." That came hard. He thought, *I've got to keep this on this level.* He sat up and turned on the light. He said aloud, "Darling, if it gives you any satisfaction you've succeeded in your purpose. I'm awake."

"It's about time," said Veda. "I think we ought to call up. And if you don't, I will."

Craig climbed to his feet. "O.K., but don't you dare hang over my neck when I'm calling. I refuse to have anybody suspect that I'm a hen-pecked husband. You stay right here."

He found himself relieved that she had forced the issue. He went out of the bedroom and shut the door firmly behind him. On the video, he gave his name. There was a pause, and then a grave-faced man in an admiral's uniform came into view.

His image filled the videoplate, as he bent over the videophone in the patrol office. He said:

"Mr. Craig, the situation is as follows: Your son is still in the company of two Yevd. A very ingenious method was used to get across the barrier, and at the present moment we suspect that about a hundred Yevd posing as boys are somewhere in The Yards. Nobody has tried to cross in the last half hour, so we feel that every Yevd in Solar City who had been prepared in advance against the particular defense we had in that area is now in The Yards. Although they have not yet concentrated on any particular point, we feel that the crisis is imminent."

Craig said in a steady tone: "What about my son?"

"Undoubtedly, they have further plans for him. We are trying to provide him with a weapon, but that would have a limited value at best."

Craig realized wretchedly that they were being very careful to say nothing that would give him any real hope. He said slowly: "You let a hundred of these Yevd get onto the 'Way' without knowing what they were after?"

The admiral said: "It's important to us to learn their objective. What do they value? What do they think is worth such a tremendous risk? This is a very courageous enterprise on their part, and it is our duty to let it come to a head. We are reasonably certain of what they are after, but we must be sure. At the final moment, we will make every effort to save your son's life, but we can guarantee nothing."

For a brief moment Craig saw the picture of the affair as these hard men visualized it. To them, Diddy's death would be a regrettable incident, nothing more. The papers would say, "Casualties were light." They might even make a hero out of him for a day.

"I'm afraid," said the admiral, "I'll have to ask you to break off now. At this moment your son is going down under the ship, and I want to give my full attention to him. Good-by."

Craig broke the connection, and climbed to his feet. He stood for a moment bracing himself, and then he went back into the bedroom. He said cheerfully:

"Everything seems to be all right."

There was no reply. He saw that Veda was lying with her head on his pillow. She had evidently lain down

to wait his return, and had immediately fallen asleep.

Very carefully, he tucked her in, and then crawled into her bed. He was still awake at dawn, restless, tired and unhappy.

"What'd that dame whisper to you?" asked Jackie.

They were going down the escalator into the tunnel beneath the "Way". Diddy, who had been listening intently for the sound—there wasn't any particular noise—turned.

"Oh, just what she said to you."

Jackie seemed to consider that. They reached the walk and Diddy started immediately along it. Casually, he looked for a metal pillar with an H on it. He saw it abruptly, a hundred feet ahead. Behind him, Gil spoke:

"Why would she go to the trouble of whispering to you, if she was going to tell us anyway?"

Their suspicion made Diddy tremble inside, but his training told, "I think she was just having fun with us kids," he said.

"Fun!" That was Jackie.

Gil said: "What are we doing here under the ship?"

Diddy said: "I'm tired."

He sat down on the edge of the walk beside the five-foot-thick metal beam that reared up into the distance above. He let his feet dangle down to the tunnel proper. The two Yevd walked past him, and stood on the other side of the pillar. Diddy thought with a dizzy excitement, *They're going to communicate with*

each other—or with others.

He steadied himself, and fumbled under the overlapping edge of the walk with his hand. Swiftly, he ran his fingers along the metal. He touched something. The tiny blaster came easily into his hand, and he slipped it into his pocket in a single synchronized motion. Then, weak from reaction, he sat there.

He grew aware of the vibration of the metal on the bones of his thighs. His special shoes had absorbed most of that tremor, and he had been so intent on the weapon that he hadn't noticed immediately. Now he did. Ever so slightly, his body shook and shivered. He felt himself drawn into the sound. His muscles and organs hummed and quivered. Momentarily, he forgot the Yevd, and for that moment it seemed immeasurably strange to be sitting here on the raw metal, unprotected and in tune with the sound itself.

He'd guessed the vibration would be terrific under the ship of ships. The city of The Yards was built on metal. But all the shock-absorbing material with which the streets and roads were carpeted couldn't muffle the ultimately violent forces and energies that had been concentrated in one small area. Here were atomic piles so hot that they were exploding continuously with a maximum detonation short of cataclysm. Here were machines that could stamp out hundred-ton electro-steel plates.

For eight and a half years more, The Yards would exist for this colossal ship. And then, when it finally

flew, he would be on it. Every family in The Yards had been selected for two purposes—because the father or mother had a skill that could be used in the building of the ship, and because they had a child who would grow up in and around the ship.

In no other way, except by growing up with it, would human beings ever learn to understand and operate the spaceship that was rising here like a young mountain. In its ninety-four hundred feet of length was concentrated the engineering genius of centuries, so much specialized knowledge, so much mechanical detail, that visiting dignitaries looked around in bewilderment at the acres of machines and dials and instruments on every floor, and at the flashing wall lights that had already been installed in the lower decks.

He would be on it. Diddy stood up in a shaking excitement of anticipation—just as the two Yevd emerged from behind the pillar.

"Let's go!" said Jackie. "We've fooled around long enough."

Diddy came down from his height of exaltation. "Where to?"

Gil said: "We've been tagging along after you. Now, how about you going where we want to go for a change?"

Diddy did not even think of objecting. "Sure," he said.

The neon sign on the building said, "RESEARCH", and there were a lot of boys around. They wandered singly and in groups. He could see

others in the distance, looking as if they were going nowhere in particular. It was hard to believe that they were all Yevd, but Diddy had the awful empty feeling that they were.

Research. That was what they were after. Here in this building, human beings had developed the anti-Yevd bacteria of the barrier. Just what the Yevd would want to know about that process, he had no idea. Perhaps, a single bit of information in connection with it would enable them to destroy a source material or organism, and so nullify the entire defense. The Play Square had intimated on occasion that such possibilities existed.

All the doors of "Research" were closed, the first building like that he had seen. Jackie said: "You open up, Diddy."

Obediently, Diddy reached for the door handle. He stopped, as two men came along the walk. One of them hailed him.

"Hello, there, kid. We keep running into you, don't we?"

Diddy let go of the door, and turned to face them. They looked like the two "men" who had originally brought him to the barrier, and who had made the bacteria test on him. But that would be merely outward appearance. The only Yevd inside the barrier of all those in Solar City would be individuals who had been immunized against the particular bacteria which he had isolated for them at that one part of the barrier.

It would be too much of a coinci-

dence if both The Yards agent images had belonged to that group. Accordingly, these were not the same.

Not that it mattered.

The spokesman said: "Glad we bumped into you again. We want to conduct another experiment. Now, look, you go inside there. Research is probably protected in a very special fashion. If we can prove our idea here, then we'll have helped in making it harder for the Yevd to come into The Yards. That'll be worth doing, won't it?"

Diddy nodded. He was feeling kind of sick inside, and he wasn't sure he could talk plainly in spite of all his training.

"Go inside," said the Yevd, "stand around for a few moments, and then take a deep breath, hold it in, and come out. That's all."

Diddy opened the door, stepped through into the bright interior. The door closed automatically behind him.

It was a large room in which he found himself. *I could run*, he thought. *They don't dare come in here*. The absence of people inside the room chilled the impulse. It seemed unusual that there was no one around. Most of the departments in The Yards operated on a round-the-clock basis.

Behind him, the door opened. Diddy turned. The only Yevd in sight were Jackie and Gil standing well back from the door, and other boys even further away. Whoever had opened the door was taking no

chances on getting a dose of anything, dangerous or otherwise.

"You can come out now," said the man's voice. He spoke from behind the door. "But remember, first take a deep breath and hold it."

Diddy took the breath. The door shut automatically as he emerged. And there were the two Yard "police" waiting behind it. One of them held up a little bottle with a rubber tube. "Exhale into this," he said.

When that was done, the Yevd handed it to his companion who walked quickly around the corner of the building and out of sight.

The spokesman said: "Notice anything unusual?"

Diddy hesitated. The air in the building, now that he thought of it, had seemed thick, a little harder to breathe than ordinary air. He shook his head slowly. "I don't think so," he said.

The Yevd was tolerant. "Well, you probably wouldn't notice," he said. He added quickly, "We might as well test your blood, too. Hold up your finger."

Diddy cringed a little from the needle, but he allowed the blood to be taken. Gil came forward. "Can I help?" he asked eagerly.

"Sure," said the "man". "You take this around to my friend."

Gil was gone as only a boy could go, at a dead run. A minute ticked by, and then another minute; and then—

"Ah," said the "man", "here they come."

Diddy stared at the returning pair with a sickly grin. The Yevd who had been standing beside him, walked swiftly forward to meet the two. If the two "men" said anything to each other, Diddy was unable to hear it. Actually, he took it for granted that there was a swift exchange on the light level.

The communication, whatever its nature, stopped.

The "man" who had done all the talking came back to Diddy, and said: "Kid, you've sure been valuable to us. It looks as if we're really going to make a contribution to the war against the Yevd. Do you know that air in there has an artificial gas mixed with it, a fluorine compound? Very interesting and very safe by itself. And even if a Yevd with his fluorine metabolism should walk in there, he'd be perfectly safe—unless he tried to use the energy of his body on a blaster or communication level. The energy acts as a uniting agent, brings about a chemical union between the fluorine in the air and the fluorine in the Yevd body—and you know what fluorine is like even at room temperatures under the right conditions."

Diddy knew. The chemical reactions of fluorine and its compounds had been a part of his education since the earliest days.

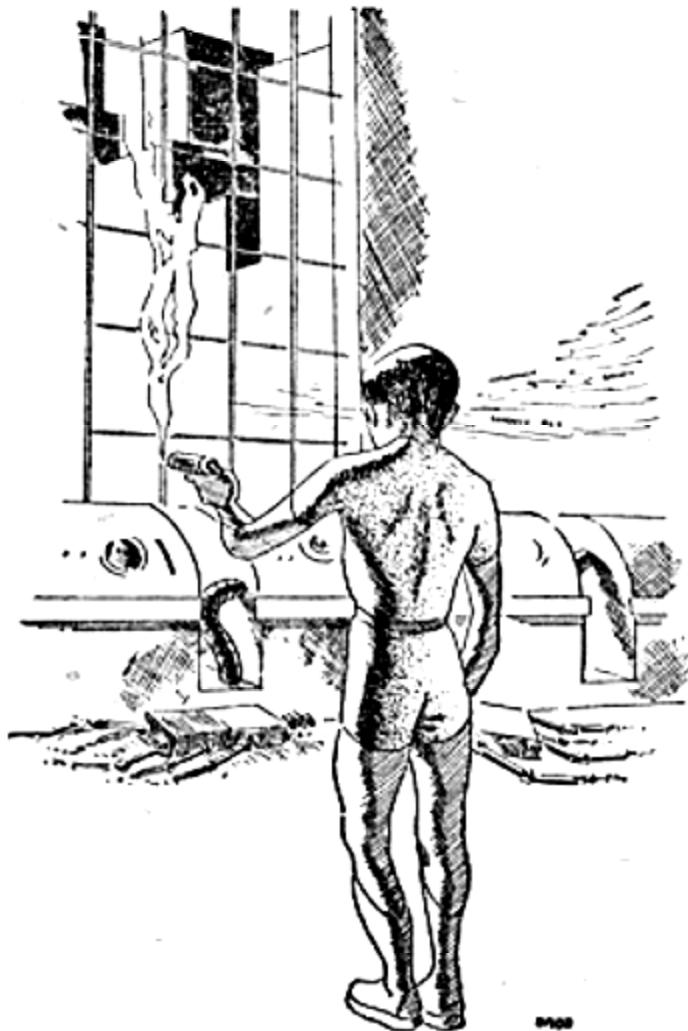
"It flames up violently," said the "man" with apparent satisfaction. "And the Yevd himself is the only one who can set off the explosion. Very clever. But now, I gather that all you kids want to go inside and

have a look around. O.K., in with you. Not you"—to Diddy—"not for a minute. I want to have a little talk with you. Come on over here."

He and Diddy drew aside, while the "boys" rushed through the door. Diddy could imagine them spreading through the building, searching out secrets. He thought wearily, *Surely somebody will do something, and quickly.*

The Yevd said: "Confidentially, kid, this is really an important job you've done for us today. Just to give you an idea, we've kept an eye on the Research Building pretty well all night. The staff here usually goes home around midnight. Since midnight, a couple of workmen have gone into the place, installed some equipment, and departed. They put a radio hook-up over the door, with a loud-speaker both inside and out. And that's all that happened. Right now, except for you kids, the whole place is empty. You can see how much the people here have depended on the bacteria barrier keeping the Yevd away."

He paused, then went on, "Of course, the Yevd could spy out most of that information in advance, and if they finally got across the barrier they could set up guards all around the building, and so prevent even the most powerful armored forces from getting through to the defense of the building. It could be blasted, of course, from a distance, and destroyed, but it's hard to imagine them doing that very quickly. They'd wait till they'd tried other methods.



"You see where that would take us. The Yevd would have an opportunity to search out some of the secrets of the building. Once outside, they could communicate the information to other Yevd not in the danger area, and then each individual would have to take his own chance on escaping. That's bold stuff, but the Yevd have done similar things before. So you see, it all could happen easy enough. But now, we've prevented it."

"Diddy"—it was a whisper from above and to one side of him—"don't show any sign that you hear this."

Diddy stiffened, then quickly relaxed. It had been proved long ago

that the Yevd electronic hearing and talking devices, located as they were inside sound deadening shoulder muscles, could not detect whispers.

The whisper went on swiftly: "You've got to go inside. When you are inside, stay near the door. That's all. There'll be more instructions for you then."

Diddy located the source of the whisper. It was coming from above the door. He thought shakily: *Those workmen who installed the radio the Yevd mentioned—the whisper must be coming through that.*

But how was he going to get inside when this Yevd was so obviously delaying him?

The Yevd was saying something about a reward, but Diddy scarcely heard. Distractedly, he looked past the "man". He could see a long line of buildings, some of them brightly illuminated, others in a half darkness. The vast brilliance from the ship cast a long shadow where he was standing. In the sky above, the night seemed as black as ever.

There was no sign of the bright new morning, only hours away now.

Diddy said desperately: "Gosh, I'd better get inside. The sun will soon be up, and I've still got a lot of places to look."

The Yevd said: "I wouldn't waste much time in there. Take a look inside, huh, and tell me what the other kids are doing."

Quivering, Diddy opened the door. And went in. And let the door close behind him in its automatic

fashion.

"Diddy," came the whisper, "unless a Yevd carries a weapon right out in the open, then he's dependent on the energy from his cells. A Yevd by his very nature has to wander around without any clothing on. It's only his body that can produce the images of human clothes and human form. Now, think carefully. Did you see any of those boys carrying a weapon? Whisper your answer."

"I don't remember seeing any," said Diddy shakily.

"We'll have to hope that your memory is accurate," came the answer. "If it is, then any weapon they appear to produce will be an image weapon. Now, listen, how many boys are in sight?"

There were two, both of them bent over a desk on the other side of the room.

"Two." The whisper echoed his count. "Good. Take out your gun and shoot them."

Diddy put his hand in his pocket, swallowed hard—and brought out the gun. His hand trembled a little, but for five years now he had been trained for such a moment as this, and he felt awfully steady inside. It was not a gun that had to be aimed perfectly.

It fired a steady blue streak of flame, and he merely waved its nozzle towards where the Yevd were. They started to turn. And collapsed as they did so.

"Did you get them?" The whisper again.

"Yes." His voice trembled. Across the room what had been two apple-cheeked boys were changing. In death, the images couldn't hold. And though he had seen pictures of what was emerging, it was different seeing the dark flesh coming into view, the strange legs—

"Listen—" the whisper caught him out of that shock—"all the doors are locked. Nobody can get in, nobody out. Start walking through the building. Shoot everybody you see. *Everybody!* Accept no pleas, no pretense that they are just kids. We've kept track of every other real boy, and there are only Yevd in the building. Burn them all without mercy."

"And, Diddy, I'm sorry this is the way it had to be. But you were the only one we could work through. You were right in there with them. The only reason you're alive is that they probably think you may still be of use to them inside the building, in case something turns up. You are the only one they do not seriously suspect. Any other method we might have used would have cost us hundreds of lives. But now, let's go! You take care of those inside. We'll go after the ones out here."

"And remember your training for caution. Don't go through a doorway until you've looked in. Remember, also, they can't shoot back. If they even try it, their bodies will start on fire. Good luck, Diddy. The battle is all yours."

The trap was so complete that there was not a single moment of

real danger to the boy.

It was still pitch dark as Diddy caught a helicar at Cross 2 and flew to within a block of the hill, from which "explorers" like himself had to watch the sun rise. He climbed the steps that led to the top of the hill, and found several other boys already there, sitting and standing around.

While he could not be certain they were human, he had a pretty strong conviction that they were. There seemed to be no reason why a Yevd should participate in this particular ritual.

Diddy sank down under a bush beside the shadow shape of one of the boys. Neither of them spoke right away, then Diddy said:

"What's your name?"

"Mart." The answering voice was shrill but not loud.

"Find the sound?" asked Diddy.
"Yep."

"So did I." He hesitated, thinking of what he had done. Just for a moment he had a sharp awareness of how wonderful was the training that had made it possible for a nine-year-old boy to act as he had acted, and then that faded from his foreconsciousness, and he said: "It's been fun, hasn't it?"

"I guess so."

There was silence. From where Diddy sat, he could see the intermittent glare of the atomic furnaces as the sky flared with a white, reflected fire. Further along was the jewel-bright aura of light that partially

framed the ship. The sky above was no longer dark, and Diddy noticed that the shadows around him were not dense any more, but grayish. He could see Mart's body crouched under the bush, a smaller body than his own.

As the dawn brightened, he watched the ship. Slowly, the metal of its bare upper ribs caught the flames of the sun that was still not visible from where they sat. The glare expanded downward, and sunlight glinted on the dark, shiny vastness of its finished lower walls, the solid shape it made against the sky beyond.

Out of the shadows grew the ship, an unbelievable thing, bigger than anything around it. At this distance the hundred story Administration Building looked like a part of its scaffolding, a white pillar against the dark colossus that was the ship.

Long after the sun had come up, Diddy stood watching in an exaltation of pride. In the glare of the new day the ship seemed to be gathering itself as if poised for flight. Not yet, Diddy thought shakily, not yet. But the day would come. In that far time the biggest ship ever planned and constructed by men would point its nose at the open spaces between the near stars and fly out into the darkness. And then indeed would the Yevd have to give ground. For they had nothing like this. Nothing even near it.

At last, in response to the familiar empty feeling in his belly,

Diddy went down the hill. He ate breakfast in a little "Instant" restaurant. And then, happy, he caught a helicar and headed for home.

In the master bedroom, Craig heard the outer door of the apartment open—and almost he was too slow. He caught his wife with her fingers on the knob of the door.

He shook his head at her gently. "He'll be tired," he said softly. "Let him rest."

Reluctantly, she allowed herself to be led back, to her own bed this time.

Diddy tiptoed across the living room to the Play Square and undressed. As he crept under the sheets, he grew aware of the faint tremor of the air. Lying there, he felt the quaver of his bed and heard the shudder of the plexiglas windows. Below him, the floor creaked ever so faintly in its remote, never-ending rapport with the all-pervading vibration.

Diddy grinned happily, but with a great weariness. He'd never have to wonder about the sound again. It was a miasm of The Yards, a thin smoke of vibration from the masses of buildings and metal and machines that tendrilled out from the "Way". That sound would be with him all his life; for when the ship was finished, a similar, pervasive sound would shake from every metal plate. *

He slept, feeling the pulse of the sound deep inside him, a part of his life.

Completing him.

THE END



SUBURBAN FRONTIERS

BY ROGER FLINT YOUNG

The ideal form of insurance would, of course, insure you—not your heirs. They had ideal insurance—and a terrific political-military problem as a result!

Illustrated by Hicks

George Linden stopped at the threshold of the office and looked across to the window where Badick was sitting. Badick looked up from the papers in his hand and started to smile. He saw Linden's face, then, and the smile never quite hit his lips.

The two men looked at each other, gravely, while Linden closed the door behind him, then went to his own desk in the corner. It was

Badick who looked away, finally, his eyes drifting toward the window, then, remembering, back to the papers in his hand.

There was something very close to hatred in Linden's young, almost handsome face. The little wrinkles at the corners of his mouth made his blue eyes look bitter and tired. He still watched Badick, waiting, wanting the older man to speak first.

Badick still stared at the papers in his hands, not looking up, swallowing continually, his large Adam's apple running up and down his throat.

Linden sighed, finally, put his feet up on the desk and let his body relax. He looked away from Badick; his eyes sought a spot on the ceiling, failed to find one, and concentrated on nothing at all.

"You should have gone," he said. "You should have had to take it. It should have been your job."

Badick cleared his throat before answering. "I know it, George. Was it—bad?"

"Bad? *Bad?*" Linden laughed shortly. "He blistered me. He burned me. He turned me inside out and put hot coals between my skin and my bones. They're still there."

"George, I'm sorry. One of us had to go and say no to him. You could keep on saying it because you didn't have the authority to say anything else."

Linden ignored him. "And that was just the start. He'll crucify us, Will. Crucify us. You and me—I've wondered how that kind, gentle old statesman could survive among politicians. Now I know. He's got the personality of Medusa, the tongue of a hundred ports, and he'll have the vengeance of a jealous god."

Badick nodded. "I knew something of that, George. That's why you had to be the one to face him. You did say nothing doing?"

Linden grunted. "What choice

did I have? The President of the United States turns on the heat, and I can't even give him an apology or a good reason. Just 'No, Mr. President.' I won't go back, Will. You'll have to go next time."

Badick sighed and shrugged his resignation. "All right, George. We're unpatriotic, of course?"

"Naturally. Printably speaking, we are the very seeds of treason, the flowers that blossom in the hothouse of national disunity, and we are the core of defeat. And that's the least of our crimes. That we don't bow to President Martin S. Warner seems to be our major failing."

"I suppose so. Well, we've still got our business to run, George."

"For the moment, you mean. You don't think Basic Assurances is big enough to get away with this, Will. From what Warner said we're already on the skids."

Badick met his eyes, now, and looked at him steadily. "How?"

"How? Lord, Will, they'll fix us. There's a dozen ways they can do it. From what Warner said, though, they'll know all our secrets, and the government will take care of things without troubling Basic Assurances at all."

"They could, of course." Badick stabbed at the intercom on his desk, waited until Miss Ayers answered. "Get Hammond in here." He looked at Linden again. "If they get the right men and follow us in theory, they could get there, all right."

Hammond came in the office, a

small, balding young man, very self-reliant, very assured. He nodded slightly to the two men and took a chair without speaking.

"How are your rumors today, Hammond?"

Hammond shrugged slightly and kept the grin off his face. "The president had George for tea at the White House. It is said that the president found George quite indigestible."

Linden looked at Hammond then and both men smiled slightly. "I'll bet," Linden suggested, "you could have told me that before it happened?"

"Almost," Hammond admitted.

Badick waved this aside. "We want to know if the government is making any effort to duplicate Basic Assurances' work."

Hammond seemed annoyed. "I send you both reports every day. That's what you hire me for. Then you don't read what I send. If you'd—"

"All right, we don't read them all the time. How will it boil down?"

"Violently. Warner's been on your tail for about three months. They've backtracked both of you since your school days. They know every move you've made since then, every book you've read, every movie you've seen, every date you've had, and about every other thought that's been in your minds."

"All right. That doesn't help them."

"No? They know how your minds work and what's interested you

through the years. They know what you wrote for college theses when you had your choice of material. They know where all your interests have been, and they have an idea of what they're after. They've checked every supply house and know every piece of equipment you've ever ordered. So they know what you used for material and tools. They've got men who can put those things together."

"It still won't get them there."

"It started them well enough. All that, and ICM."

"They found that?"

"Sure, Will. They found that two months ago. ICM made a special calculating machine for you a few years ago. So they decided they needed one, too."

Linden looked a little pleased. "That's all right. Even with the special ICM machine it took us two years to get the answer. They can't put things through it any faster than we did."

Badick was frowning. "How many did they order?"

"Indefinite. They've already got delivery on a hundred and some of them. They're taking them as fast as ICM can get them off the line."

Linden looked at Hammond suspiciously. "It took ICM six months to make one for us."

"Sure. Then ICM thought the design over, decided it was good for general mathematical usage, and got it ready for mass production. They were about to start their marketing

campaign when government agents came along."

Linden swore softly. "How long, Will?"

Badick shrugged. "Depends on how well they know what they're doing. If they break the steps up properly between machines they can get the answer in . . . if they're lucky, say—"

"They were lucky," Hammond broke in. He was very casual, as though it didn't matter, as though he didn't know it were a bombshell. "They got the answer three weeks ago. They built an experimental portal and tried it out yesterday."

There was silence for a few minutes. Linden and Badick waited for Hammond to speak. Hammond brought out a pair of nail clippers, worked on his nails, then trimmed the wick of his cigarette lighter.

"All right, what happened?"

Hammond smiled lightly, then. "I'm still waiting for the report."

Linden grunted. Hammond stood up. "I'll let you know as soon as I find out."

Both men nodded, but neither spoke. Hammond reached the door, then turned back.

"There's going to be a war." He wasn't looking at either of the other men.

"Yes," Badick said, admitting it. "Yes, there's going to be a war."

Hammond hesitated before going on, shifting uncomfortably. "There'll be some atomic bombing, naturally."

"Naturally." It was Badick again.

"Basic Assurances could get the ones that land in this country, and—Well, it'd save a lot of lives, and property. It might be the balance in the war."

"Yes."

"Well—" Hammond looked at the two men, from one to the other, then down at the doorknob. "I guess it isn't my job to tell people things they already know."

"I guess not."

Hammond nodded. "That's the way I figure it. I'll let you know." He closed the door gently behind him.

"Well?"

Badick smiled. "I don't know of anything to say."

"No . . . I'm going to look around."

Badick didn't answer. Linden got up from his desk, then turned back and shuffled through some papers, half-wondering if there were anything that needed doing. He dropped them back to the desk, and left the office.

Jane was in the outer office, talking to Miss Ayres. She didn't see him, for the moment, and Linden stood still, watching her. As always, the first glance at her brought him the *feel* that was in the very sight of her: That intense look of the very goodness of life. Then, as always, the shocking drop inside him at the remembrance of her illness, already beginning to take the young life away from her.

Jane looked up, smiling, when she

heard Linden, went to him swiftly. She was still smiling when she kissed him, and her soft eyes looked over his shoulder into some far distance.

Linden held her away to get a good look at her. He dabbed at the corners of her eyes where the tear-drops were.

"How is it, Jane?"

"Good, darling. Good."

"What do you mean?"

The smile was fixed on her face now, looking a bit strained. "No worse, George. Not that they can tell. So that means it's good."

Linden nodded and tried to smile. "All right, Jane. Let's sit down some place and talk."

"No. I'm always resting. I'd rather walk."

"I was just going downstairs to look things over. Want to come with me?"

"Yes." She took his arm, steered him away from the elevator, toward the stairs. "I said walk."

The stairs brought them out on the first floor, behind the reception room. Linden stopped for a moment, looking at the people waiting for appointments.

"Counting the house, George?"

He nodded. "Business is getting good, all right. Every satisfied customer-client, rather—means a dozen more customers."

"Clients."

"Yes, clients." They went down the long hall behind the reception room, stopped before one of the compartments. Linden held the

curtain aside, for Jane. She looked in first.

"There's someone in there."

"Yes." Linden motioned her in.

The man in the chair didn't see them. His eyes were opened wide, staring at the wall where the wheel turned steadily. Jane watched the wheel for a moment. It was fascinating, the way the color bands first caught the eyes, then, as they revolved, made the eyes follow them to the center of the wheel where the small bright light shone so brightly. It hurt the eyes, a little, it was so bright, so bright, and she never wanted to look at anything else again, just watched the little bright—

She couldn't see it any more. Jane became aware that someone was shaking her. She couldn't see anything.

"Jane!" Linden was beside her, still shaking her gently, one hand in front of her eyes. "Jane! . . . That's better." She heard him laugh. Then she was wide awake again, looking toward him. He took his hand from before her eyes.

"I'm sorry, George. I know better, of course. But I just looked at the wheel and it got me, before—"

"Easy!"

"What?"

"You were starting to look at it again."

"All right. I'll be careful."

She kept her eyes away from the wheel, looked back at the man in the chair. He was well past middle age, paunchy, well-dressed. He reminded

her a little of a frog, the way his eyes were almost popping while he stared at the wheel, and the way the lines were almost gone out of his face, his face smoothed out and softened because of his drooping lower jaw.

She could hear the loud-speaker in the wall now.

"—need anyone. Any time you need anyone. Need anyone. Whenever someone can help you. If you're in pain. In pain. Accident and no help around. Whenever you need anyone. Need anyone. Whenever—"

She listened to the voice, over and over, and knew it was only a recording and couldn't get her unless she looked at the wheel.

"—subconscious inside you must cause automatic reaction. Your wristband will give you protection. Your wristband can save you. Whenever—"

Jane looked down at the plain metal band that circled her own wrist. At the stud that need only be pressed— There were some things that Basic Assurances couldn't help, no matter how hard the stud was pressed. Sometimes you could need help and—

She shook her head. This wasn't helping. Jane turned as the curtain moved, watched the red-haired young girl in white come in, cross briskly to the wall and stop the wheel. She realized the voice from the speaker had stopped.

The man in the chair was clearing his throat, blinking his eyes, and already looking sheepish, apologetic.

"Must have fallen asleep. I was watching that confounded wheel, and—"

He stopped, uncertain of what *had* happened. The nurse smiled at him.

"You were meant to fall asleep, Mr. Bronson. While you were asleep you were given all the information you'll require to operate the wristband. Now if you'll—"

Mr. Bronson was out of the cubicle, on his way to Band-fitting and Consignment Accounting when the girl in white brought another man in, seated him in the same chair, and started the wheel again.

They stood in the hall and watched the steady flow of clients in and out of the compartments, wondering going in, bewildered coming out. Only a few of the clients were women.

Jane giggled suddenly, turned to Linden. "It seems so silly. They come here and pay you ten percent of their entire worth as a retainer, and all you do is confuse them."

"It straightens out, by the time we release them. Remember when you went through? We've got the system a lot better now."

"I remember. I was confused all the way through, and getting rather angry. Then, after the lecture at the end, I began to feel all right. Safe and secure in the motherly arms of Basic Assurances."

Linden nodded, not really listening. "If we could get them to come during the night, we wouldn't have so much of a problem. We could go on a twenty-four hour shift here. The way business is coming in now

we'll have to open another place. And now isn't the time to expand."

"Why not? With all this business coming in—"

Linden started to tell her about his trip to Washington, didn't. "We're not making any money. Will keeps putting everything he can into trade material. We just keep enough out to take care of overhead."

"George—I want to go through the portal with you sometime."

"No— Well, I don't see why not, at that. I'm going through later today. Maybe—"

"I'm sure it'll be all right with Will."

Will nodded. "No reason why Jane can't. Are you sure you want to take her with you this time, though?"

"Why not?"

"Hm-m-m. No reason, I guess. You're going to have to tell Phlan what President Warner said."

"What?"

"We have to. Warner didn't know it, of course, but his offer wasn't to us, really. Not to Basic Assurances. It was to the Phlen."

Linden looked at his friend closely. "It's all right to lean over backwards, Will. You're built that way. But now you're falling over backwards."

Badick smiled. "If you can, put it so Phlan will reject the idea. If he doesn't, we'll have to talk him out of it. Try to make him see the Phlen would be cat's-paws and the

chestnuts would be very hot ones."

"All right, Will. I know what a cat's-paw is, I guess."

"You should. You're beginning to look like one."

"Which I should."

The big bookcase in the wall of the office swung back, revealing the silver gridlike doorway built into the wall. Linden took Jane's arm. She held back, suddenly.

"This is— I always thought it was something like a radio. Electronics and all, I mean."

Badick nodded. "This is just the portal end of it. The next two offices were ripped out to make room for the electronics that drive it. If it's tubes you want, there's over six thousand of them just in the portal circuit. Happy?"

"Hm-m-m. Let's go?"

Linden hung back then. "You're sure you feel up to it, Jane?"

"Of course. Let's go."

They stepped into the grid doorway. Linden was prepared for, hardly felt, the inner wrench as they went through. He remembered it, what it was like the first few times, when he realized Jane was staggering under the shock.

"He couldn't reach her, quite. She was beside him, untouchable, a vague outline in the rose-haze beyond the portal.

"I'm all right now." He knew she had spoken the words, though he'd heard nothing, could not make out her lips, but felt the words in his mind.

"It can't hurt you, darling. I



can't help you now, though. You'll have to shift for yourself. We can't touch each other, or anything."

"I'm all right." The words seemed to come from a long way off, then strengthened. "You're not talking to me. You're thinking at me. That's what I'm doing now. Can you . . . hear me?"

"Yes. Yes, Jane."

"It's easier to think words than try to talk them. This isn't the other . . . this isn't where the Phlen live, is it?"

"No. This is Inbetween. This is where we meet. Phlan, the permanent representative of the Phlen, lives here."

"Is that his name?"

"It's just what we call him. Names—they don't mean much. Here he comes."

Linden first, then Jane, felt the presence of another, drawing closer to them. Then it was beside them, and Jane could see only a bulge in the rosy haze where she knew Phlan must be.

Gradually she became better aware of him, though not with her eyes. She became aware of what he *should* look like, if she could see him.

He was man-sized, but there any resemblance to humanity ended. He was leathery, rubbery, from the dome of his head— She felt an inner gasp as she got a better conception of what Phlan was like. He was built like a cone, with the top rounded off, and bulged into what

must be a head. A head with a mouth, but without hair or eyes or nose or ears. His "body" seemed smooth and unbroken except for the four arms that came out of it, on the upper part not far from the head. Apparently he was without feet.

She felt the thought: "Linden, I hope you have come with a promise of more copper. We must have more lattices."

"No, Phlan. There will be copper, though, in a few weeks."

Phlan's returning thought was derisive. "A few weeks to your people. That is many generations to us. Many generations."

"I'm sorry, Phlan. You must also understand that many generations to you are but a few weeks to us. That we must have time to get the copper and have it made into the proper strips, and then delivered."

"Why did you come?"

Jane thought she caught a flash of resentment in Linden's mind, one that was quickly smothered.

"I have an offer from our government, Phlan. We are faced with a war in which there will be atomic projectiles and bombs. I think you understand?"

"I understand the formulation, yes."

"We face the threat of having many of those atomic bombs dropped on our cities. Our government would like you to handle them."

"Your government is now aware of our existence?"

"The offer was made to Basic As-

surances, Phlan," Linden answered.

"How much copper would there be?"

Linden hesitated. "All you can use, almost. More than you've ever had from Basic Assurances. Probably more than you could ever get from us."

"We will accept."

"No, Phlan. You don't realize what it means. The bombs would go off in your world. Probably as soon as you could grapple them through. It would mean the lives of the grappling crew, at least."

"Six Phlen. The price would be low. We could evacuate any other Phlen from the vicinity before we brought the bombs through."

"Yes. Basic Assurances is against a nation solving its war troubles by bringing a neutral world into the conflict. There is no reason the Phlen should suffer for our mistakes."

"The suffering would be light, Linden, compared to what our gains in copper would be. How long will it be before the first bombs would have to be grappled?"

"In our time? Perhaps weeks, or months, or even years. The war might start anytime, or hold off."

"Then we would like the same form of payment as Basic Assurances uses."

"I don't—I see. The United States would pay a retainer to you, in copper, for which you would agree to take care of the bombs as they come?"

"Yes. The longer before the

bombs come, the more copper we would get."

"I suppose so. I can say nothing as I'll have to talk to Badick."

Jane realized that Phlan was leaving them, drifting off into the haze without effort.

"Is that all?"

"For the moment. Let's go back—No, don't try to walk. Just think of the portal and let yourself drift to it."

Badick closed the bookcase behind them.

"Phlan wants to do it," Linden told him. "I didn't argue."

"We'll see. I want to hear from Hammond before I do anything."

"Yes. Jane!" Linden took her by the arm and helped her to a chair.

"All right, now, George. Just felt a little rocky. There's no time there, is there?"

"Inbetween? No. That's what we call it, by the way: Inbetween."

"That's cute."

"We didn't mean for it to be. We've just never thought of any other name."

"There's time, all right, Jane," Badick assured her. "But it's a lot different from ours, or from the Phlen's. It's a time outside of time. Phlan has been there for a great many of his generations, staying there just to contact us. Messengers come from his world, bringing him the latest news."

Jane shuddered. "It must be lonely, by himself there. His wife,

children, relatives— He would have all of those?"

"Yes. But if someone didn't stay there it would mean we would have to contact a new generation every time we talked to them. Phlan acts as co-ordinator, never aging in In-between."

The telephone buzzed shortly. Badick picked it up, listened for a moment, then put the instrument down.

"Hammond. The government experimental portal gave them some trouble."

"How?"

"They sent six men through. None came back. Then while they were fussing around with it, the portal disappeared on them."

"Ungh!"

Jane looked at the two men in perplexity.

"What does that mean?"

"The six men went through the portal to the Phlen dimension. Apparently the government missed the idea of Inbetween. The Phlen got the six men as they came through, then grappled the portal through. It wouldn't have occurred to them to have it anchored."

"Got them? But what would they do?"

"Hold them for knowledge. When we first discovered the Phlen they were a semicivilized race. They had the capacity, but not the actual civilization."

"But Phlan seemed—"

"Well, they had more than the capacity, actually, but they didn't

have the world a civilization could exist on readily. Their world isn't like ours. It's like Inbetween."

"You mean they have to live in *that* all the time?"

"It's worse. Inbetween is more like our world, in some ways, than it is the Phlen-world. Nothing is solid, everything is mist and haze, and their 'farm-lands' must be followed by the farmers, lest they drift away from them entirely."

"Nothing is solid? Nothing?"

"Not as we understand it. Our experiments show us that the haze and mist of their world can be used to make anything that we make in our own world. However, the Phlen still lack the understanding to handle their material."

"No wonder they have difficulties in setting up a civilization!"

"Yes. We contacted them, as I said. When we went through the first time, we weren't expecting anything, really, and we found the Phlen, found we could communicate with them.

"They needed our help in establishing a civilization. By experiment we found that copper lattices could be made that would give them solid bases on which to center their communities.

"We couldn't finance the copper they needed. We didn't think our own world was ready for contact with them. So we took advantage of the difference in time rates. You know about that."

"A little. Basic Assurances supplies a client with a wristband and

hypnotic instructions. If he's ever in trouble, needs help, he presses the stud. I suppose the Phlen come then."

"Yes. The wristband sends a tone to listeners on the Phlen-world. They can use the tone for location. They find the place in their own world corresponding to the clients' position in this. Then they break through with the grapplers we've supplied to them."

"But how can they help? If they're only partly civilized, what can they do?"

"We've trained many Phlen as instructors, and they've trained squads. If a client on a hunting trip gets acute appendicitis, and there's no doctor, he presses the stud on his wristband.

"It's only a fraction of a second to him before help gets there. Perhaps a month or more to a squad of Phlens. They don't know what the trouble is, of course, and have to be prepared for any emergency.

"The client never knows just what happens. If its something like appendicitis, the grapplers give him an anaesthetic, pull him through Inbetween, operate, let him recuperate under hypnosis they can put him in with their sense of perception. Then they put him back where he was.

"The client wakes up a few seconds, Earth-time, after he's touched the stud on the wristband. He's well, his appendix is gone, and he's got the scar to show for it.

"The grappling squad has noted

the number of the wristband, and we get that, through Phlan, with the information. We send the client the bill for services rendered."

Jane nodded. "I've heard of some of those seeming miracles. But the Phlen can't see?"

"They can see almost as well as we can, though in a somewhat different way. They don't have our eyes, but they have their perception."

"I felt as though I had a perception sense in Inbetween. The Phlen can do anything with the grapplers, then?"

"Almost. If your car is plunging over a cliff, press your stud. Before you hit a Phlen squad will grapple it back to the road. Accidents, operations, fires, drownings—Basic Assurances has saved clients from every possible misfortune, and the client never knows what's going on."

Jane shook her head. "There's so much I don't understand. How can they see through into this world to know what to do?"

"We built scanners that look through— We probably could make ones that would see from our world into theirs, but we've never had need for them."

"And your only payment to them is in copper strips?"

"Almost. That's what they need most, to give them a foundation for a city civilization. We could never supply them with food, of course. They can eat some of our foods, but we'd never be able to grow things as fast as they can eat them."

"But, it doesn't seem right. Using them for service like that. If they want copper, it should be traded to them, as equals."

"That could be done, if they had something to offer in trade besides service—and if the world was ready to accept them. As it is, bringing the Phlen to public recognition now would mean opening new frontiers for the nations of this world to fight over."

"Yes, I can see that."

The phone buzzed. Linden reached for it, held it to his ear for a moment, then put it down.

"Hammond again. How does he do it?"

"Do what?"

"Get the information he does. As soon as he does. He says the Berrendese Government military is confident they have a perfect defense against the atom bomb."

Badick looked at his watch. "It can't be the same. It hasn't been long enough since you talked to Phlan. He couldn't have—"

"No, not since then. It means he knew about it before I went to him."

"That's likely. They've been using scanners for spying, of course. It would have to be out of Inbetween, though."

"No. Not if they've got any sort of recording device. Lucky we're protected here. I guess this is the hatching of the egg, all right."

Jane looked at the two men, puzzled.

"Egg?"

"We knew we were heading for trouble sooner or later. The Phlan have too many ideas, and we're moving too slowly for them. They're ambitious now, want their civilization, and they don't want it to come through Basic Assurances. They're getting greedy, want all they can get."

"There'll be trouble, then?"

Badick spread his palms. "There shouldn't have been any way they could make it. We tried to take precautions. We can shut off the grapplers. But they've got the government portal. They can go on from there without us.

"If they figure out how to power their grapplers from the portal, there isn't much we can do."

"We'll be at their mercy?"

"Not completely. We've taken precautions we never thought we'd really need. But they can make it rough for us."

"Fight us? Kill us?"

"They could do that. We wouldn't have much to fight back with. We could invade them but we couldn't supply the invading army. The logistics would be impossible. We couldn't make supplies as fast as they would be used. We couldn't replace the men as fast they would be put out of action just from old age. Unless we could conquer immediately, of course, and there wouldn't be much hope for that. We'd be fighting in a world too alien, too little understood. But their weapon will be blackmail."

Linden faced Phlan through the rosy haze of Inbetween.

"That has to be our plan," Phlan admitted. "Basic Assurances can't give us what we need. We contacted the Berendese Government and they promised us a copper retainer. We'll get the same from your government. And others."

"That will be just the beginning of it, won't it?"

"Yes. When they're accustomed to paying, we'll ask more from them. Of course, now that we have the portal, it will be easy to keep the countries stirred up, on the verge of war. It isn't a policy with which I am in sympathy, but our own cause must be considered first. Military secrets developed by one country will be sold to another. For copper. Later on, for other supplies. For technicians to train our people in what they must know."

"You'll force us to fight back."

"No, there will be no war between us. Your methods developed for Basic Assurances will give us too much power."

"You'll bleed us to death," Linden warned. "We haven't the population to supply yours with all its needs. Mass production will mean nothing against the terrible consumption rate of your people."

"Not bleed you, Linden. We'll milk you. It will all work out quite well."

"We'll run from you, Phlan. We won't be Earth-bound much longer. If we have to take all of our people to the other planets to get away from

you, we'll do that. You won't be able to stop us."

"We wouldn't try to stop you, Linden. You'll find the new relations will be almost on the same basis as with Basic Assurances. We will provide a service to your people, and you will give us what we need. Our wisest leaders have discussed it thoroughly and found it morally right."

Linden saw no hope there. They would be able to justify all they did, to themselves. If they were in need, they would create a situation in which they could be of service.

"You won't try to stop us from going to the planets? Not even if we all go?"

"No, not even if you all could go. Not even if it meant your getting away from us entirely. But it's no difference, actually, to us, whether you live on this island or another."

"It clicked, then," Linden told Badick. "I always wondered what Phlan meant by referring to Earth and other planets as islands. That's all they are to the Phlen, islands set down in the midst of their world. Their world must take in all the solar system—and perhaps beyond—dotted with islands of another dimension that are the planets."

Badick nodded. "That's what I've suspected. They don't live on a space that's comparable to Earth's position. Their world lies between the planets. If we could lay copper lattice tracks in their world, we could walk from here to Venus."

"Fort said something like that."

Linden frowned, reached for "The Book of the Damned." He thumbed pages for a minute. "If one could break away from the traditions of the geographers, one might walk and walk, and come to Mars, and then find Mars continuous with Jupiter?"

Badick smiled grimly. "I don't think he was talking about the same thing. Though the Phlen-world would explain a lot of the things that puzzled Fort. However, walking wouldn't be required, of course, nor even copper lattice. Remember how it was when we were in the Phlen-world? You just wished to move, and you did move."

"Yes. They've got us. Right where we put ourselves, too. Where's Jane?"

"She left while you were going into the portal. She was rather tired."

"I know." Linden picked up the telephone, dialed a number. "Dr. Stevens, please . . . Steve, this is George Linden . . . Fine . . . How's Jane doing . . . No, Steve, don't give it to me like that . . . Tell me . . . Oh! . . . Yes . . . All right, Steve. Thanks." He dropped the phone back to its cradle. He looked older and tired.

"What did Steve say, George?"

"Same thing. She's getting worse and there's nothing to do. Have you checked Reynolds lately?"

"Yes. This morning. He came to me, as a matter of fact. The ICM came up with an answer."

"*The answer.*" Hope showed now in Linden's face.

"An answer. He had a complete set of equations, and I sent them on to Harkness for analysis."

"But what did they mean?"

Badick shrugged. "Not too much, to me. My mathematics doesn't go far enough. I gathered that if there is an Earthtime as we know it, and if there is a Phlen-world-time, there should be a Minor."

"That's all we need then. The equations should show us how to get there."

Badick smiled ruefully. "Yes, they should. But that's assuming that the other two factors exist in actuality."

"You know they do!"

"Yes, we *know* they do. If the mathematics bears us out, it will be a cinch."

Linden rubbed his knuckles against the side of his head. "Ungh! We know that you and I exist. We assume that Basic Assurances exists. If we can prove that Basic Assurances doesn't exist, then you and I don't exist. Is that the same reasoning?"

"No, but it's the same line. We'll have to wait and see what Harkness says."

"Is he pushing it?"

"Sure. He promised a reply this afternoon."

"O.K. I'll sit and twiddle my thumbs."

"No. You'll set up a crew to work Basic Assurances from the fringes of the Phlen-world and In-between. Here's the modulation

pattern Harkness worked out for the squad cars. You know what it means; the men won't actually be either in Inbetween or Phlen-world. Impress it on them that they've got to keep the modulators going at all times except when they're grappling.

"Get work going, then shut off the Phlen grapplers."

"All right, Will."

"We're going to have to put out a lot of cash to start operating, but we'll make some money around here for a change. This'll be the first time everything hasn't been going to the Phlen."

"And Phlan?"

"Chop him off. There's nothing else we can do. We have to come first, now."

"About time."

"Maybe. Reynolds has all the tab cards. He ought to be able to sort them and run them off in an hour. Take this list of squad components and have him sort them, too. Better get several of the girls to help telephoning men as soon as Reynolds can get the list."

"Sure."

Linden was back at five. He took one look at Badick.

"You've been up to something."

"Lots of things. Harkness came by. Minor exists, all right. He's standing over a couple of technicians converting the standby portal."

Linden sat down, feeling suddenly limp and tired.

"It'll work, then?"

"Harkness isn't saying that. He hardly spoke to me; you know how he is. The way he acted, I think he's pretty sure it will do what we want."

"That's a relief. What else? You've got something inside."

"Yes. But how did you make out?"

"First squad went through. I sent Hammond with them through the big portal. They've got everything from sewing kits to fire-fighting equipment. Hammond can get them used to things. The extra men I sent with them can be seeded into the other squads as they form."

"All right. Better cut the grapplers."

"I did. The Phlen can't get through without the government portal."

"Good. They've got some other worries from now on."

"You did it, then?"

"Yes. I keep telling myself I didn't have any choice. I still feel like a mass executioner."

"It might not work." Linden looked at Badick, looked away quickly at the sight of the now gray face.

"I don't know." His voice was weary and there was the sound of defeat in it. "I don't know. A little, I hope it won't work. Mostly, I hope it will. We've got to win, and win fast."

"Yes. It should work. I think your reasoning was good."

It was a moment before Badick said anything. "It was your idea as much as mine."

"No it wasn't, Will. Remember—" Linden stopped, looked at Badick. "I see. Someone will get the credit."

"It isn't that, George."

"The devil it isn't. You're thinking of giving me the credit. Same old cat's-paw."

"I don't want the credit."

"Do you think I do? There have been worse wanton destroyers in history than the Vandals, but they got stuck with the name. Governor Gerry gave his name to gerrymander. Captain Boycott gave his name to a cause. Thomas Bowdler contributed to bowdlerize. Charles Lynch and the lynch law. Quisling and—"

"All right, George."

"All right, nothing. Mankind will have other examples of this in the next thousand and ten thousand years. I don't want lindenize to become part of the language; a word synonymous with destruction of intelligent races by using inferior races as—"

"I know. Cat's-paws."

"Yes. Badickize them if you wish, but leave me out of it."

"All right, George. Sooner or later it will come out. We'll have to think of something before then."

"We'll think of something. I'm going over to the standby portal. Coming?"

"No. I've had enough for the day. I'm going home."

"Right."

It was two in the morning before

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the last wire was changed the last new tube socket in place.

Harkness wiped more oil into his face, grinned at Linden.

"All set. We'll try it tomorrow."

"Hey! What's wrong with now?"

"Who's going in? I'm not. I can't ask these men"—he waved at the technicians—"to."

"I'm going. You knew that."

Harkness grinned again. "Go to it, Son. She's all yours."

"It'll work?"

"Should. If you bang your head on the wall, then the portal isn't working."

"I'll go slow."

Linden started through, walking slowly, keeping his eyes on the plaster wall behind the portal. If it worked, he'd never reach the wall.

He felt the wrench, sharper than when he went through the portal to Inbetween. He felt the floor give way beneath him, the jar, and the buckling of the knees as he dropped several feet to solid footing once more.

He looked ahead of him. Here was no mist of Inbetween or Phlen-world. This was much like the Earth he knew. The sky was blue above him, the grass green beneath his feet, and trees—

He felt the rough pull on his shoulder, started to turn. Then he realized he was caught tight in a harness. He struggled against it, briefly, then felt himself pulled up.

There was a wrench, then he was pulled again. He stumbled back.



Someone caught and steadied him, turned him around and started removing the harness.

Harkness. Linden blinked, looked around the room. The technicians were gone. He saw Badick close to him, Hammond further away, and Reynolds in the background holding a handful of the inevitable tab cards.

"I was coming back, boys, really I was. What's the idea?"

"How long were you there, George." Harkness had the harness off him, was leaning forward eagerly. "How long did it seem?"

"I just got there. Three or four seconds, perhaps. Five at the most. Why?"

Harkness grinned happily. "It took us a week to get you out of there. It was my fault. I just stood there for a while, like a fool, waiting for you to come back. Then I realized that if the portal had put you in Minor we'd have to pull you out, or wait the rest of our lives while you turned around to start back."

"A week— It seemed just those few seconds."

"We had to build a scanner to locate you, then a grappler and a harness to get at you. Then we had a tough time fishing. The grappler slowed down to nothing once it hit Minor time. We had to maneuver the harness for three days to slip it over you. Now I know what a Basic Assurances' rescue squad goes through."

"The harness came so fast I couldn't fight it."

"All right. You've got your Minor."

Linden was just realizing it. He turned to Hammond. "Get hold of Jane, and have her come down."

Hammond winked. "She's on her way, George."

"Good. We'll shove her in first. Then others. I've got the plans worked out. I can go in when she does and—"

"No, George."

Linden swung toward Badick. "What do you mean?"

"No one goes in like that. No one except people like Jane and those who'll be needed to help them."

Linden stared at Badick, not saying anything.

"Sorry, George. But think it over. You go in because you want to be with Jane. Then her mother and father want to be near her. Maybe her sister. Then maybe her sister's boy friend. Then maybe his family. It'll be that way with everybody. Send one person like Jane in and a dozen perfectly well people will drag along."

"All right. The land can support them. It's like Earth, and—"

"We saw it through the scanner. It looks better than Earth. If everyone goes there, where will the advantage be?"

"We have to make full use of the time differences. Jane, and others that need medical attention beyond present knowledge, can go there. They'll be almost in suspended animation, as far as Earth is concerned."

On Earth we'll go about our daily tasks. Gradually, research will produce knowledge that will help those in Minor."

"But— You're right, of course. But I can die of old age while Jane is spending a short while, to her, in Minor."

"Yes— So you'll push research that will cure her, won't you?"

"More than that. I'll start a research center in Phlen-world. A few days, weeks, Earth time, and—" Linden stopped abruptly, and then looked at Badick questioningly.

Badick nodded. "Hammond knows of a few things that have happened while you were in Minor. Phlan went through to Washington. Right through the barrier into Warner's office. Just about scared the old boy to death.

"Phlan pulled him into Inbetween and talked turkey. Warner bought in, but hasn't released any information. Apparently he's going to get the money out of some special appropriation . . . Hammond says our Chief Executive got a really nasty shock out of Phlan."

Linden grinned. "O.K. Maybe I'm even with him. The things I had to sit and take from the old—Jane!" He hurried forward and took her hand as she came in the door.

"Jane, I want to put you through this portal for a few minutes. Other people will be along pretty soon to keep you company. They'll bring food and supplies—"

"But, George . . . George!"

Linden kissed her briefly on the cheek, steered her through the portal, watched her disappear.

"I forgot to warn her about the drop. Well, it isn't bad. We can take a month before sending what I promised, and she'll still be standing there, blinking her eyes."

Badick caught his eye, motioned with his head.

The two men left the room together, heading for their office.

"How is it?"

"Good, George. Basic Assurances is rolling smoothly. We've started expanding, and I'm considering some branch offices. I'm hiring as fast as I can find suitable people."

"All right. How about the Phlen?"

"We haven't been able to get hold of Phlan. We developed some scanners, but they're useless against the time-rate. All we get is mist. I think Phlan is some place in Inbetween. You could probably reach him."

"I'll try."

They reached the office, went in and swung the bookcase back.

Linden peered through the rose-mist, searching, not remembering. Then he closed his eyes, letting his sense of perception reach out, sharpen, call through the haze.

He became aware of Phlan's approach and thought it was with more haste than was usual.

"Linden. Why did you come?"

"To exchange thoughts."

"It is well, Linden. I have been wishing for you."

"I am here."

"We have decided to send a colony to your world, Linden, to live and learn and observe."

Linden hesitated before commenting. "It will not be comfortable in our world. The sense of perception is almost useless. You will not be able to move about except with the use of attachments to your body."

"Still, we wish it."

Linden caught the underlying urgency in the thought that Phlan tried to keep casual.

"How many are there in this colony, Phlan?"

"About two thousand."

"Where are they?"

Linden felt that Phlan tried to stop the thought, but it was too late. "Here . . . In Inbetween."

"So— We refuse permission."

"Linden! Remember, we can make things severe for your people."

"No." You are not asking for a colony, Phlan. You seek sanctuary."

It was long before Phlan answered. "Yes, Linden, we beg sanctuary."

Linden felt sympathy. "This two thousand—"

"There are no other Phlen left."

"I'm sorry, Phlan. But your threat was too great. You forced us to it."

"I understand, now . . . Linden, we had no choice against them. At first we ignored the few we perceived. They multiplied with amaz-

ing rapidity, attacked our farms, took our food so that our peoples starved.

"At first they destroyed. Then they seemed to learn. There were mutations. They developed an alert, savage intelligence. They took over our farms, developed them, fought off our counterattacks. They used their teeth and claws against us, then learned to fashion weapons that killed at a distance. They slaughtered us even for food."

"They became much like you humans, Linden, in the way they built and fought and thought."

"We did not expect them to develop intelligence, Phlan, but we thought they would cause a diversion."

"They are horrors. They have learned to fashion the mist-material. Whatever you can make on your world, Linden, I think they can make on Phlen-world. They were your rats, of course?"

"Yes. A cunning, destructive rodent on our world. A conqueror on yours. Stay here, Phlan, and I will talk to Badick."

"Warner made the deal with them, Badick. Let him supply the colony with land and food, and figure out what to do with them. We can make a guarantee on atomic warfare. We can make projectors to hurl bombs into Phlen-world."

Badick shook his head. "I've been dodging it, George. Basic Assurances will give basic assurance from now on. We'll guarantee peace-on-earth. You can start planning

your research center on Phlen-world."

"Yeah? All right, I'll get the big game hunters."

"Who?"

"The big game hunters to kill the tigers."

"What tigers?"

"The ones who kill the wolves who kill the dogs who kill the cats who kill the rats we sent against the Phlen."

Badick shook his head, then laughed.

"We won't be needing all of that,

George. Phlan told you those rats had developed intelligence, a civilization not unlike Man's. They've mutated, George, remember that?"

"Yes. But they're still savage, still wanting to fight and kill. You'd deal with them? With rats?"

"Of course. We'll give them the benefits of a more advanced civilization, George, and let them work out their own destiny. All the benefits: Gunpowder and dope and atomic warfare and bacteria and poison gas. A few of our weeks, and—"

George nodded.

THE END

THE ANALYTICAL LABORATORY

This month's An Lab is a rather special number, discussing a rather special issue—the November, 1949 issue. As most of our readers are aware by now, that issue was made up to match, as closely as possible, the "prediction" made by reader Richard Hoen in the letter which appeared in the November, 1948 issue. The job was fun, and the co-operation of the authors and artists involved was, naturally, essential; everyone seemed to enjoy it. And, incidentally, reader Richard Hoen didn't know it was coming until he received a special copy of the November '49 issue autographed by the entire group of authors. It took eight pre-publication copies of the magazine to get that done; Hoen's, and one for each of the authors, to keep Hoen's copy from being held up at each stop on, perhaps, a "never sign anything before you read it" basis.

Because of type-setting problems, the Brass Tacks letters concerning the November issue can't be put in this issue; they'll be in the March number. Including, naturally, Mr. Hoen's revised ratings on the November '49 issue. However, this department—which rates, technically, as a filler item—can be set after the pages of the magazine have been made up. So the votes are available for the Lab, even if the letters can't be printed till next month. And the voting goes:

Place	Story	Author	Points
1.	Gulf (Pt. I)	Robert A. Heinlein	1.38
2.	...And Now You Don't (Pt. I)	Isaac Asimov	2.33
3.	What Dead Men Tell	Theodore Sturgeon	3.00
4.	Final Command	A. E. van Vogt	4.09
5.	Over The Top	Lester del Rey	4.90

All of which leads me to point out that it would have been grossly unfair to any new author to run his first story into that sort of issue. And that there simply doesn't seem to be any fair, self-consistent way of comparing scores from issue to issue. The story you just read always has a stronger impression in your mind than the story you read three months back.

The Editor.

NUMBER NINE

BY CLEVE CARTMILL

His active trouble began on that afternoon when Jackson Andrews caught rabbit Number Nine reading the textbook of optical glass.

His first thought, naturally, was that Number Nine had somehow got out of her cage and hopped up on the laboratory desk where a head of lettuce had been put down absentmindedly and forgotten. The book, propped against the desk lamp so that the rabbit could see it with one eye, could also have been a piece of absent-mindedness.

Then, as he stood in the doorway touching these possibilities with the edges of his mind, Number Nine turned a page and continued to munch on the head of lettuce.

Certain oddities then began to agitate Jackson's consciousness. The lettuce was Iceberg in variety, and he knew for a fact that the only head in the house had been in his refrigerator.

But Jackson was not one to jump to conclusions. He was young, to be sure, but his was the scientific method: careful accumulation of data over a long period of time, the meticulous classification of same, and even then the drawing only of conclusions which seemed inevitable.

He looked back at the rabbit. It continued to nibble the diminishing

head of lettuce, and did not seem to display any interest in the textbook. But even as he watched, Number Nine reached out a paw and flipped another page.

Slow reader, Jackson thought inanely, and backed out of the doorway. He would check first on the lettuce. He didn't want to go into the laboratory—yet. His mind refused to examine the reasons why, perhaps because he could not possibly call them scientific reasons.

The refrigerator was closed, but one of the kitchen chairs stood suggestively close to the door. Jackson firmly put aside any contemplation of this and opened the box. The lettuce was gone.

He closed the door and went aimlessly out the back way to the garage. He wasn't sure just what he was going to do, but he wanted to go some place where he wouldn't be alone with his own thoughts.

He started his car, and it seemed to drive itself to Cynthia's apartment house. He went up to the top floor in the elevator and knocked on a door. It was answered by an elf.

That's what he thought in the first jolt of realization, but the elf became a little girl in costume.

"Are you coming to my party?" she asked.

The human race developed the trick of intelligence to survive; the rabbit race survived by sheer reproduction. Wherefore Number Nine looked like a first-rate menace!

Illustrated by Brush



Jackson looked up at the number on the door. "Imagine that," he said to the little girl, and turned toward the stairway. He could feel her eyes on his back as he started down.

He descended two floors, knocked at the right number, and it was Cynthia who greeted him this time. She said, "Oh, nuts!" and fled. "Come in and shut the door," she called over her shoulder. He caught the sheen of metal on her dark hair as she vanished into the bathroom in a swirl of terry cloth.

He entered the room and oozed into a chair, from which he gazed vacantly at a spot in space halfway between him and the nearest wall.

"Of course," she said, through the bathroom door, "you wouldn't think to call and let me know you were coming. Not dressed, curlers, no make-up. Well, you can just sit for a while. There's fresh coffee on the stove."

Coffee, he thought with sudden desire. A cup of coffee would go good right now. Help settle his nerves. He got to his feet, went out of the apartment with no thought in mind but coffee. Black. But maybe with just a touch of rum.

He summoned the elevator, presently got into his car and drove home. He parked at the curb in front, but went around to the kitchen door. Before he did anything else, he took the kitchen chair from beside the icebox and set it on the back porch. With a ball of twine from a service cupboard he tied the chair

to the drain pipe underneath one of the laundry tubs.

He put fire under the coffee pot and set the table with a clean cup, saucer, spoon and his emergency bottle of rum. He waited until the pot made hot-enough noises, turned off the fire, and filled the cup with rum. He sat down and stirred the rum absently, tasted a spoonful and, finding the temperature lukewarm, drank the rest in two swallows.

He rinsed the cup, turned it upside down on the drain board, and walked into the living room. He switched on the radio and went to the big front window. With his handkerchief he cleaned off an area of dusty glass and stared unseeing at the front lawn.

He didn't want to think, but slivers of thought penetrated his consciousness despite himself. Number Nine . . . notes on treatment . . . neural pathology . . . reaction times . . . he ought to get his notes, but they were in There . . .

He squared his shoulders and started toward the laboratory. The telephone rang. Cynthia.

"What are you doing home?" she demanded.

"Huh?" he said vaguely. "Me?"

"Yes, you. I thought you were getting a cup of coffee."

"Oh. Oh, yes. I just had one, thanks. My mawn needs lowing."

There was a long silence.

"Well, good-by," Jackson said finally, and hung up. Another cup

of coffee before mowing the lawn, he thought with pleasure.

He heated the coffee and had another cupful of rum. He sipped it this time, for the temperature seemed about right. He thought, with snug self-approval, that he had turned the fire off just in time. A minute longer and it would have been too hot. That's what practice does for you, he thought.

He eyed the level in the bottle. Just one more cup left, he thought. If he drank it immediately, it would still be the right temperature and he wouldn't have to waste gas in heating it again.

He emptied the bottle into his cup and raised it to his lips. Number Nine trotted through the kitchen at this moment.

Jackson set the cup down and bowed. The rabbit waved a negligent paw at him and went out onto the back porch. Jackson sipped at his cup and listened to rummaging sounds on the porch. He got up and went to the doorway.

"Can I help?" he asked politely.

Number Nine was standing on her hind feet, apparently trying to reach one of the objects on a window ledge.

She pointed at a small crucible which Jackson had used in some forgotten experiment and he gave it to the rabbit.

Number Nine held it in her front paws and hopped away on her hind feet. Jackson took his seat at the

table and finished his drink. It occurred to him again that he should get his notes from the laboratory, but he decided against it. Number Nine was apparently busy, and Jackson, innately polite, hated to interrupt.

His telephone rang again.

After some difficulty in distinguishing between transmitter and receiver, Jackson answered.

"Dr. Andrews?" said a male voice. "This is Carroll at Trans-America Aircraft."

"Oh, yesh. Hello."

"You expected to have some kind of results by now, doctor. Are you in a position to discuss the matter?"

"Definitely, yesh."

Mr. Carroll's voice grew warmer. "Good, good. I told you at our last meeting that the Board was intensely interested in your plan to speed up reaction time in our pilots and other personnel. And the Board meets tomorrow. Could you come out and bring your data this afternoon?"

"Why—" Jackson hesitated, and his subconscious took over.

If the treatment on Number Nine, it told him, could achieve in a rabbit the results he had been ignoring consciously, think what it could do in intelligent human beings. The current concept of genius would be relegated to moronic levels. He hadn't tested Number Nine's reaction times, but that was a minor matter. What had happened to Number Nine mentally was not only tremendous and earth-shaking, it could bring him a fortune.

He snapped back to the present and tried to frame a sentence without sibilants, for he was beginning to realize what had thickened his tongue. "I'll bring out my reshul—Uh, I'll come over right away."

"Fine, doctor. I'll be waiting."

Jackson hung up and went out to the kitchen. He verified his suspicions by the emptiness of the bottle and fullness of the pot, and knew he needed a quick shot of B-1 and a cold shower.

He came out of the shower in comparative sobriety and considerable dismay. He fought his reluctance, which had returned two-fold, to enter the laboratory, and the battle was a stalemate until the thought of great riches tipped the scales.

He dressed, combed his hair, squared his shoulders and went to the laboratory.

Number Nine was crouched at ease on the desk, with another book propped directly in front of her this time. She looked like any tame rabbit from behind, even though a little larger than most. Still, there was something, a gleam—

Jackson caught his breath and strode over to the desk. Number Nine waved what looked like a greeting and continued reading. But Number Nine was reading through spectacles.

Not spectacles, exactly, but a pair of prisms which had been in a spectrograph, now fastened to frames

which had been bent to conform to the contours of Number Nine's head and eye structure. Jackson remembered the frames—an old pair discarded when he bought rimless reading glasses.

"Excuse me," Jackson said tentatively, "but can you understand what I say?"

Number Nine turned full face to Jackson, her pink eyes magnified through the prisms, and nodded gravely.

"Can you really read?" Another nod. "Did you fix up those spectacles?" Again, the affirmative inclination.

Jackson thought a moment, went to his files, and took the notes on Number Nine's treatment. He laid the carbon copy on his desk. He tucked the original in his pocket and Number Nine under one arm. "We're going places," he said. "And I mean Places," he added with sudden glee.

He placed Number Nine beside him on the seat of his convertible, took keys from his pocket, and fumbled at the ignition switch for some time before he discovered he was trying to put the key in it upside down.

When he turned the key, Number Nine promptly jumped over the right-hand door to the sidewalk and looked back at Jackson pinkly.

"Hey, come on back here!"

Number Nine backed off a couple of paces and shook her head. Jackson scratched his

"You mean you're scared to ride in a car?" She shook her head again. "Well, come on, then." Another negative. Jackson scratched his nose. "Are you scared to ride with me, then?" This brought a decided affirmative. "You think I'm not sober enough." Agreement to this was emphatic.

Well, Jackson reflected, maybe Number Nine was right. Here was a grown man arguing in public with a rabbit wearing spectacles, and taking it calmly.

"Will you go on a bus?"

Number Nine agreed. Jackson pocketed his keys, got out and tucked Number Nine under his arm again, and began the two-block walk to the bus stop.

He met and passed a few pedestrians, but they seemed intent on their own business and none gave the spectacled rabbit a second glance. If they only knew, Jackson thought, thinking of tomorrow's headlines and fame. For he intended to go from the aircraft company to a newspaper office. Perhaps the company would arrange a press conference.

But if the pedestrians were indifferent or unaware, the bus driver was not. "No rabbits," he said firmly, "without they're in a box. Or a silk hat," he added with a chuckle, giving the blonde two seats back an arch glance.

"But your sign only says no dogs," Jackson protested.

"The sign ain't drivin'," the driver

said, with another backward glance.

Jackson stood at the curb, after the bus was gone, in low spirits which were not the result alone of the bus driver's animal discrimination. His recent debauch contributed its share, too. He was on the verge of getting a hangover.

A nearby Neon sign gave him ideas. The sign read "Scotty's."

He set Number Nine on the bar, and Scotty gave him a one-sided smile. "What's the matter with the rabbit, nearsighted?"

"Reading glasses, so she can read with both eyes at once," Jackson said. "Give me a double rum, and give her a side order of lettuce and today's paper, if you have it."

Scotty filled the order with the air of a man who is never surprised.

"Will you stay here and read while I make a phone call?" Jackson asked Number Nine. A nod sent him to a wall telephone at the back. He called Cynthia.

"I've got an important appointment at Trans-America," he said. "Will you drive me?"

"Well, . . . yes," she answered hesitantly. "But why don't you drive yourself?"

"My rabbit won't ride with me."

"Did you say—?" She broke off helplessly.

"Yeah, my rabbit won't ride with me."

"Hm-m-m. I . . . see. Where are you?"

"Scotty's."

"I thought so," Cynthia said grimly. "I'll be right over."

He went back to the bar and found Number Nine semicircled by a small group of patrons.

"If I didn't know better," a tall man said, "I'd say that rabbit was reading the paper."

"It sure is a good trick," admitted a truck driver. "Oh, here comes the guy what belongs to it. I never heard of a rabbit doin' tricks. Thought they was too dumb."

"It's no trick," Jackson said, swallowing half his rum.

"Don't gimme that. He ain't really readin'."

"She," Jackson corrected. He glanced at the paper. "Show the man the word 'Russia' in that top headline," he said.

Number Nine, munching a leaf of lettuce, put a paw on the word.

Dead silence fell, except for Scotty's washing of glasses at the far end of the bar.

"Signals yet," the tall man said in disgust.

"You try it," Jackson invited.

The tall man showed Number Nine a press card. He looked up at the ceiling and said in a bored voice, "All right, show me the paragraph which says, 'Sources close to administration leaders, who declined to be quoted, said the impending crisis is one which will—'"

Number Nine put her paw on a paragraph in the middle of the right-hand column.

"Coincidence," the tall man said, but in a shaken voice. "Let's try again. Show me the item which says, 'Vivisection Held Boon To Science.'"

Number Nine looked up at the tall man, then turned her back on him with a shudder.

"You hurt her feelings," Jackson said sharply.

"Yeah," said a red-haired man who seemed to be holding up the bar with his paunch. "Talking about that Vivian. She's jealous."

Scotty came down the bar with his lopsided smile. "Another round, gents?"

"I'll buy," the newspaper man said. "Put it down, Scotty, till pay day. And give the lady another lettuce."

"Did you see that rabbit read, Scotty?" the truck driver asked.

"I got no time for reading," Scotty said. "Except the sport pages."

"She's awful sensitive," the red-haired man said, "and any guy that'd make her feel bad ought to be ashamed."

"I'm awfully sorry," the newspaper man said. "No offense intended."

Number Nine turned around at this, and put a shy paw on the vivisection item.

"I'm forgiven!" the newspaper

man crowed. "I won't do it again, old girl. Now show me the paragraph—"

"Dr. Andrews," said a cold voice, obviously sifted between clenched teeth.

The semicircle parted for Cynthia. She looked at the rabbit, the rum, the men, and finally at Jackson.

"You called me?"

The onlookers, who had apparently heard this tone before, drifted away.

Both persuasive endearments and demonstrations by Number Nine were required to mollify Cynthia. But when she comprehended, her dark eyes sparkled and she consented to a rum collins. Number Nine thumped the paper.

"What's the matter?" Jackson asked.

Number Nine placed a paw on an item which had to do with driving.

Jackson sighed. "No drink for you, I guess." He picked up the rabbit. "Bluenose," he snorted. "Let's go."

"So long, Miss Rabbitt," the newspaper man called.

Cynthia chattered away about a church wedding and houses in the country, with scads of money earned by Number Nine, on the way to Trans-America. She patted the rabbit occasionally. She discussed certain phrases in the marriage ceremony as she drove between fields of grain which bordered the aircraft property. She sent Jackson into the

administration building with a quick but meaningful kiss.

Mr. Carroll, the grizzled personnel manager, listened attentively to Jackson's account of his experiments, examined the notes on Number Nine's treatment with alert but expressionless gray eyes, but his square face became graver and graver as the rabbit went through her paces at Jackson's request.

"It won't do, Dr. Andrews," he said at last. "My advice to you is to destroy both rabbit and notes and go fishing."

Jackson reacted with openmouthed astonishment. Number Nine turned her back coldly on both men.

"In the interests of efficiency," Mr. Carroll explained, "we were interested in speeding the reaction times of certain classifications of personnel. Your work and research along those lines is well-known, and we asked you to try to find a way of speeding up reaction to outside stimulus. But this—he pointed to Number Nine's rigid back—"is dangerous."

"But, but," Jackson stammered, "this completion I've experimented . . . I mean, well, anyway . . . has world-wide significance."

"Exactly," Mr. Carroll said dryly. "If the intelligence capacity of a few—only a few—pilots were raised as high above the norm as this rabbit's has been above its norm, they'd not only take over the company, they'd take over the country, too. Maybe the world."

Jackson thought it over. "Yes, I

see what you mean. I'm sorry, Number Nine," he said, getting up.

Cynthia took one look at his long face as he folded his legs into the car and placed Number Nine on his lap. "Well?" she demanded. "What did he say?"

"A lot of things," Jackson replied. "I got to think for a while. Let me work it out in my own head first. Let's go."

Cynthia U-turned and drove back between the grain fields that were beginning to turn purple with dusk. Jackson rolled down the window on his side to let in the cool breeze. Number Nine looked ahead, her ears folded.

Her ears suddenly shot up as a wild rabbit bounded across the road some fifty yards ahead, and without warning she flung herself through the open window and hit the pavement running. She disappeared into the grain in a few bounds on a course calculated to intercept the rabbit ahead.

"Stop!" Jackson cried, and was out of the car while the tires were still whining, and off after Number Nine.

He coursed through the knee-high grain like a hunting dog, and wished he had one. He found Number Nine's spectacles, discarded, he suspected, for less intellectual pursuits.

He tried cajolery. "Here, Num-

ber Nine! Here, baby! I won't kill you. Come back, please, little rabbit!"

He returned in dejection to the edge of the field where Cynthia stood. She took it well.

"After all," she said, "it's just another rabbit. You can repeat the treatment on a new one."

Jackson grunted as she started the car.

"Maybe," he said, "but just maybe, she won't pass her characteristics to the next generation. But she knows the treatment."

"So what?" Cynthia said lightly. "Where to?"

"I'm hungry."

They had a sandwich and coffee at a drive-in. Jackson gloomed in silence, and Cynthia let him alone.

"Now where?" she asked, when they were on their way again.

"Let's stop at my place first. I left the radio on."

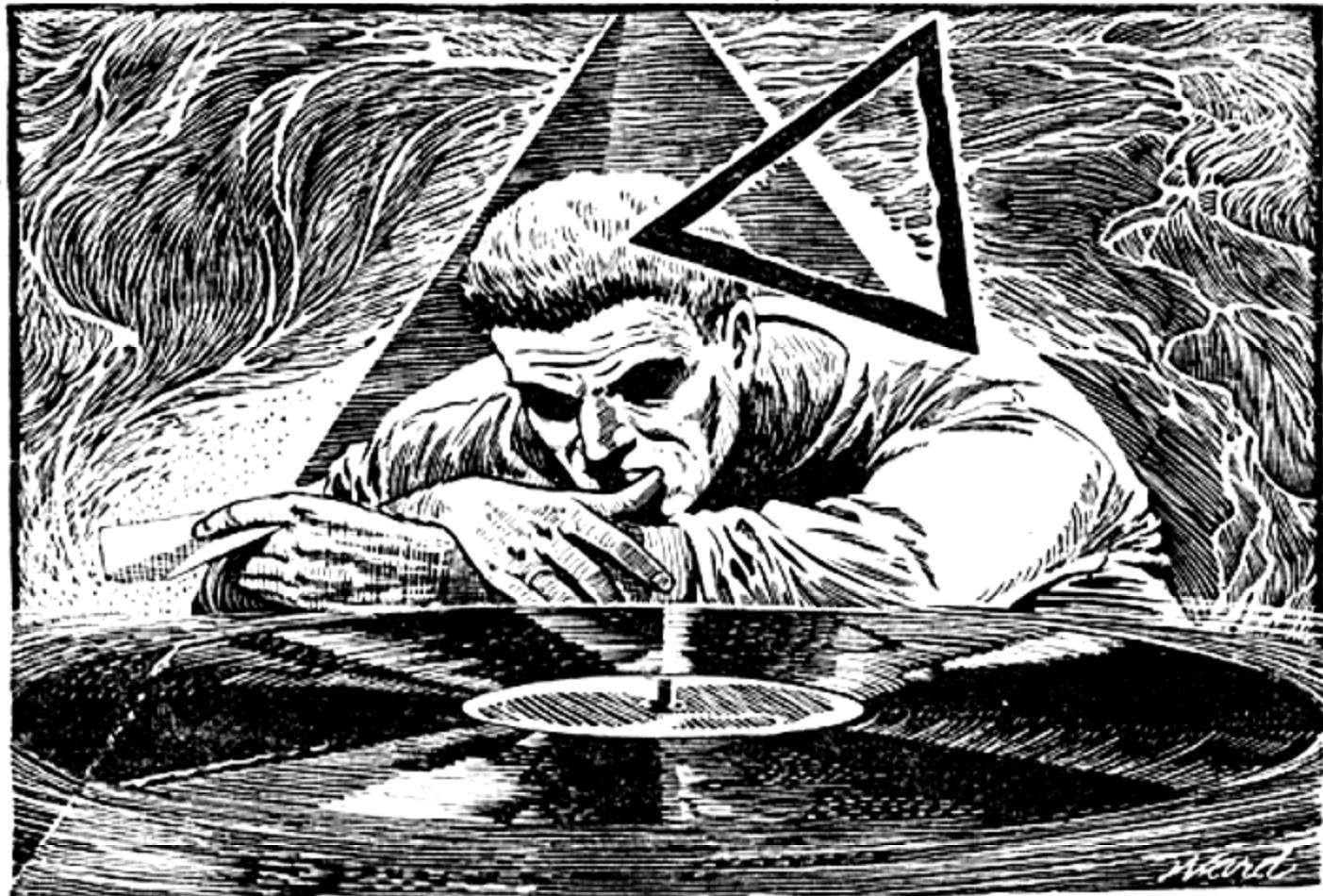
He left Cynthia at the curb while he ran into the house. He turned off the radio, and noticed the laboratory door was open, the light on. He went to it, not daring to hope.

His pessimism was justified: Not only was the carbon copy of his notes gone, but so also was every chemical he had used in the treatment of Number Nine.

And rabbits, he thought with real fear, multiply.

THE END

ASTOUNDING SCIENCE-FICTION



AND BE MERRY . . .

BY KATHERINE MACLEAN

*She had the secret of life—and, thereby,
lost the equally important secret of living!*

Illustrated by Ward

*The tusks that clashed in mighty
brawls
Of mastodons are billiard balls.*

*The sword of Charlemagne the Just
Is ferric oxide, knownen as rust.*

*The grizzly bear whose potent hug
Was feared by all, is now a rug.*

*Great Caesar's bust is on the shelf
And I don't feel so well myself!*

Arthur Guiterman

It was afternoon. The walls of the room glared back the white sunlight, their smooth plaster coating concealing the rickety bones of the

building. Through the barred window drifted miasmic vapors, laden with microscopic living things that could turn food to poison while one ate, bacteria that could find root in lungs or skin, and multiply, swarming through the blood.

And yet it seemed to be a nice day. A smoky hint of burning leaves blurred the other odors into a pleasant autumn tang, and sunlight streaming in the windows reflected brightly from the white walls. The surface appearance of things was harmless enough. The knack of staying calm was to think only of the surface, never of the meaning, to try to ignore what could not be helped. After all, one cannot refuse to eat, one cannot refuse to breathe. There was nothing to be done.

One of her feet had gone to sleep. She shifted her elbow to the other knee and leaned her chin in her hand again, feeling the blood prickling back into her toes. It was not good to sit on the edge of the bed too long without moving. It was not good to think too long. Thinking opened the gates to fear. She looked at her fingernails. They were pale, cianotic. She had been breathing reluctantly, almost holding her breath. Fear is impractical. One cannot refuse to breathe.

And yet, to solve the problems of safety it was necessary to think, it was necessary to look at the danger clearly, to weigh it, to sum it up and consider it as a whole. But each time she tried to face it her imagination would flinch away. Always her

thinking trailed off in a blind impulse to turn to Alec for rescue.

When someone tapped her shoulder she made sure that her face was calm and blank before raising it from her hands. A man in a white coat stood before her, proffering a pill and a cup of water. He spoke tonelessly. "Swallow."

There was no use fighting back. There was no use provoking them to force. Putting aside the frantic futile images of escape she took the pill, her hands almost steady.

She scarcely felt the prick of the needle.

It was afternoon.

Alexander Berent stood in the middle of the laboratory kitchen, looking around vaguely. He had no hope of seeing her.

His wife was missing.

She was not singing in the living room, or cooking at the stove, or washing dishes at the sink. Helen was not in the apartment.

She was not visiting any of her friends' houses. The hospitals had no one of her description in their accident wards. The police had not found her body on any slab of the city morgue.

Helen Berent was missing.

In the corner cages the guinea pigs whistled and chirred for food, and the rabbits snuffled and tried to shove their pink noses through the grille. They looked gaunt. He fed them and refilled their water bottles automatically.

There was something different

about the laboratory. It was not the way he had left it. Naturally after five months of the stupendous deserts and mountains of Tibet any room seemed small and cramped and artificial, but there were other changes. The cot had been dragged away from the wall, towards the icebox. Beside the cot was a wastebasket and a small table that used to be in the living room. On top of the table were the telephone and the dictation recorder surrounded by hypodermics, small bottles cryptically labeled with a red pencil scrawl, and an alcohol jar with its swab of cotton still in it. Alec touched the cotton. It was dusty to his fingers, and completely dry.

The dictation recorder and the telephone had been oddly linked into one circuit with a timer clock, but the connections were open, and when he picked up the receiver the telephone buzzed as it should.

Alec replaced the receiver and somberly considered the number of things that could be reached by a woman lying down. She could easily spend days there. Even the lower drawers of the filing cabinet were within reach.

He found what he was looking for in the lowest drawer of the filing cabinet, filed under "A", a special folder marked "ALEC". In it were a letter and two voice records dated and filed in order.

The letter was dated the day he had left, four months ago. He held it in his hand a minute before beginning to read.

Dear Alec,

You never guessed how silly I felt with my foot in that idiotic bandage. You were so considerate I didn't know whether to laugh or to cry. After you got on board I heard the plane officials paging a tardy passenger. I knew his place was empty, and it took all my will power to keep from running up the walk into the plane. If I had yielded to the temptation, I would be on the plane with you now, sitting in that vacant seat, looking down at the cool blue Atlantic, and in a month hiking across those windy horizons to the diggings.

But I can't give up all my lovely plans, so I sublimated the impulse to confess by promising myself to write this letter, and then made myself watch the plane take off with the proper attitude of sad resignation, like a dutiful wife with a hurt foot.

This is the confession. The bandage was a fake. My foot is all right. I just pretended to be too lame to hike to have an excuse to stay home this summer. Nothing else would have made you leave without me.

New York seems twice as hot and sticky now that the plane has taken you away. Honestly, I love you and my vacations too much to abandon the expedition to the unsanitary horrors of native cooking for just laziness. Remember, Alec, once when I was swearing at the gnats along the Whangpo, you quoth, "I could not love you so, my dear, loved I not science more." I put salt in your coffee for that, but you were right. I am the wife of an archeologist. Whither thou goest I must go, your worries are my worries, your job, my job.

What you forget is that besides being your wife, I am an endocrinologist, and an expert. If you can cheerfully expose me to cliffs, swamps, man-eating tigers and malarial mosquitoes, all in the name of Archeology, I have an even better right to stick hypodermics in myself in the name of Endocrinology.

You know my experiments in cell metabolism. Well naturally the next step in the investigation is to try something on

myself to see how it works. But for ten years, ever since you caught me with that hypodermic and threw such a fit, I have given up the personal guinea pig habit so as to save you worry. Mosquitoes can beat hypos any day, but there is no use trying to argue with a husband.

So I pretended to have broken one of the small phalanges of my foot instead. Much simpler.

I am writing this letter in the upstairs lobby of the Paramount, whither I escaped from the heat. I will write other letters every so often to help you keep up with the experiment, but right now I am going in to see this movie and have a fine time weeping over Joan Crawford's phony troubles, then home and to work.

G'by darling. Remember your airsick tablets, and don't fall out.

Yours always,

Helen

P.S. Don't eat anything the cook doesn't eat first. And have a good time.

After the letter there were just two voice records in envelopes. The oldest was dated July 24th. Alec put it on the turntable and switched on the play-back arm. For a moment the machine made no sound but the faint scratching of the needle; and then Helen spoke, sounding close to the microphone, her voice warm and lazy.

"Hello, Alec. The day after writing that first letter, while I was looking for a stamp, I suddenly decided not to mail it. There is no use worrying you with my experiment until it is finished. I resolved to write daily letters and save them for you to read all together when you get home.

"Of course, after making that good resolution I didn't write anything for a month but the bare clinical record

of symptoms, injections and reactions.

"I concede you that any report has to include the human detail to be readable, but honestly, the minute I stray off the straight and narrow track of formulas, my reports get so chatty they read like a gossip column. It's hopeless.

"When you get back you can write in the explanatory material yourself, from what I tell you on this disk. You write better anyhow. Here goes:

"It's hard to organize my words. I'm not used to talking at a faceless dictaphone. A typewriter is more my style, but I can't type lying down, and every time I try writing with a pen, I guess I get excited, and clutch too hard, and my finger bones start bending, and I have to stop and straighten them out. Bending one's finger bones is no fun. The rubbery feel of them bothers me, and if I get scared enough, the adrenaline will upset my whole endocrine balance and set me back a week's work.

"Let's see: Introduction. Official purpose of experiment—to investigate the condition of old age. Aging is a progressive failure of anabolism. Old age is a disease. No one has ever liked growing old, so when you write this into beautiful prose you can call it—'The Age-Old Old-Age problem'."

"Nowadays there is no evolutionary reason why we should be built to get old. Since we are learning animals, longevity is a survival fac-

tor. It should be an easy conquest, considering that each cell is equipped to duplicate itself and leave a couple of young successor cells to carry on the good work. The trouble is, some of them just *don't*. Some tissues brace themselves to hang on fifty years, and you have to get along with the same deteriorating cells until death do you part.

"From Nature's point of view that is reasonable. The human race evolved in an environment consisting mainly of plagues, famines, blizzards, and saber-toothed tigers. Any man's chances of staying unskilled for fifty years were pretty thin. Longevity was not worth much those days. What good is longevity to a corpse?

"We have eliminated plagues, famines, and saber-toothed tigers, but old age is still with us. One was meant to go with the other, but evolution hasn't had time to adjust us to the change.

"That Russian scientist started me on this idea. He gave oldsters a little of their lost elasticity by injections of an antibody that attacked and dissolved some of their old connective tissue and forced a partial replacement.

"I just want to go him one better, and see if I can coax a replacement for every creaking cell in the body.

"You can see how it would be a drastic process—halfway between being born again and being run through a washing machine. There is nobody I dare try it on except

myself, for I'll have to feel my way, working out each step from the reactions to the last step, like making up a new recipe by adding and tasting.

"Item: The best way to test your theories is to try them on yourself. Emergency is the mother of exertion.

"Thirty-eight is just old enough to make me a good guinea pig. I am not so old and fragile that I would break down under the first strain, but I am not so young that a little added youth won't show.

"One question is—just how many tissues of any kind dare I destroy at once. The more I clear away at once, the more complete the replacement, but it is rather like replacing parts in a running motor. You wonder just how many bolts you can take out before the flywheel comes off its shaft and flies away. Speed should help. A quick regrowth can replace dissolved tissue before the gap is felt. The human machine is tough and elastic. It can run along on its own momentum when it should be stopped.

"This winter I bred a special strain of mold from some hints I had found in the wartime research reports on the penicillia. The mold makes an art of carrying on most of the processes of life outside of itself. Digestion and even most of the resynthesis of assimilation is finished before the food touches the plant. Its roots secrete enzymes that attack protein, dismantle it neatly down to small soluble molecules, and

leave them linked to catalytic hooks, ready to be reassembled like the parts of a prefabricated house.

"The food below the mold becomes a pool. The mold plants draw the liquid up through their roots, give it the last touch that converts it to protoplasm, provide it with nucleus and throws it up in a high waving fur of sporangia.

"But that liquid is magic. It could become the protoplasm of any creature with the same ease and speed. It could be put into the bloodstream and be as harmless as the normal rough aminos, and yet provide for an almost instantaneous regrowth of missing flesh, a regrowth complete enough, I hope, to allow the drastic destruction and replacement I need.

"That may provide the necessary regeneration, but to have the old cells missing at the proper time and place, in the proper controlled amounts, is another problem entirely. The Russians used the antibody technique on horses to get a selectively destructive serum. That is all right for them, but it sounds too slow and troublesome for me. The idea of inoculating a horse with some of my connective tissue doesn't appeal to me somehow. How am I supposed to get this connective tissue? Besides I don't have a horse. The serum farms charge high.

"After watching a particularly healthy colony of mold melting down a tough piece of raw beef I decided that there are other destructives than antibodies.

"I forced alternate generations of the mold to live on the toughest fresh meat I could find, and then on the dead mold mats of its own species. To feed without suicide it had to learn a fine selectivity, attacking only flesh that had passed the thin line between death and life. Twice, variants went past the line and dissolved themselves back to puddles, but the other strains learned to produce what was needed.

"Then I took some of the enzyme juice from under a mat, and shot the deadly stuff into a rabbit—the brown bunny with the white spot. Nothing happened to Bunny, she just grew very hungry and gained an ounce. I cut myself, and swabbed the juice on the cut. It skinned the callus from my fingertips, but nothing happened to the cut. So then I sent a sample over to the hospital for a test, with a note to Williams that this was a trial sample of a fine selective between dead and live tissue, to be used cautiously in cleaning out ragged infected wounds and small local gangrene.

"Williams is the same irresponsible old goat he always was. There was an ancient patient dying of everything in the book, including a gangrenous leg. Williams shot the whole tube of juice into the leg at once, just to see what would happen. Of course it made a sloppy mess that he had to clean up himself. It served him right. He said that the surprise simply turned his stomach, but the stuff fixed the gangrene all

right, just as I said it would. It was as close and clean as a surgical amputation. Nevertheless he came back with what was left of the sample and was glad to be rid of it. He guessed it to be a super catalyst, somehow trained to be selective, and he wanted to get rid of it before it forgot its training.

"When I asked about the old patient later, they said that he woke up very hungry, and demanded a steak, so they satisfied him with intravenous amino acids, and he lived five days longer than expected.

"That was not a conclusive check, but it was enough. I labeled the juice 'H' for the acid ion. 'H' seemed a good name somehow.

"The first treatment on schedule was bone replacement. Middle age brings a sort of acromegaly. People ossify, their bones thicken, their gristle turns to bone and their arteries cake and stiffen. My framework needs a polishing down.

"For weeks I had cut my calcium intake down to almost nothing. Now I brought the calcium level in my blood down below the safe limit. The blood tried to stay normal by dissolving the treated bone. For safety, I had to play with parathyroid shots, depressants, and even a little calcium lactate on an hour-to-hour observation basis, to keep from crossing the spasm level of muscle irritability.

"But the hullabaloo must have upset my own endocrines, for they started behaving erratically, and yesterday suddenly they threw me into

a fit before I could reach the depressant. I didn't break any bones, but I came out of the fit with one of my ulna uncomfortably bent. The sight of it almost gave me another fit.

"When one's bones start bending it is time to stop. I must have overdone the treatment a bit. There seems to be almost no mineral left in the smaller bones, just stiff healthy gristle. I am now lying flat on the cot drinking milk, eggnogs, and cod liver oil. I dreamed of chop suey last night, but until I ossify properly, I refuse to get up and go out for a meal. The icebox is within easy reach. Maybe my large bones are still hard, and maybe not, but I'll take no chances on bow legs and flat feet just for an oriental dinner.

"Darling, I'm having a wonderful time, and I wish you were here to look over my shoulder and make sarcastic remarks. Every step is a guess based on the wildest deductions, and almost every guess checks and has to be written down as right. At this rate, when I get through I'll be way ahead of the field. I'll be one of the best cockeyed endocrinologists practicing.

"I hope you are having a good time too, and finding hundreds of broken vases and old teeth.

"I've got to switch back to the notes and hours record now and take down my pulse rate, irritability level, PII and so on. The time is now seven ten, I'll give you another record soon.

"G'by Hon—"

Her voice stopped and the needle ran onto the label and scratched with a heavy tearing noise. Alec turned the record over. The label on the other side was dated one week later.

Helen said cheerfully:

"Hello, Alec. This is a week later. I took a chance today and walked. Flat on my back again now, just a bit winded, but unbowed.

"Remember the time the obelisk fell on me? They set my arm badly, and it healed crooked with a big bump in the bones where the broken ends knitted. That bump made a good test to check the amount of chromosome control in this replacement business. If it approaches true regeneration, the bump should be noticeably reduced, and the knitting truer, to conform better to the gene blueprint of how an arm should be.

"The minute I thought of that test I had to try it. Risking flattened arches I got up and took the elevator down to the second floor office of Dr. Stanton, and walked right through an anteroom of waiting patients to the consulting room, where I promptly lay down on his examination table.

"He was inspecting a little boy's tonsils and said irritably:

"I really *must* ask you to wait your turn— Oh, it's Dr. Berent. Really Dr. Berent, you shouldn't take advantage of your professional position to— Do you feel faint?"

"Oh I feel fine," I told him charmingly, "I just want to borrow your fluoroscope a minute to look at an old break in the right humerus."

"Oh yes, I understand," he says,

blinking. "But why are you lying down?"

"Well, Alec, you remember how that young man is—rather innocent, and trying to be dignified and stuffy to make up for it. The last time we spoke to him, and you made those wonderful cracks, I could see him thinking that we were somewhat odd, if not completely off our rockers. If I tried to tell him now that I was afraid my legs would bend, he would have called for a padded wagon to come and take me away.

"I said, 'I am afraid that I have upset my parathyroids. They are on a rampage. Just a momentary condition, but I have to stay relaxed for a while. You should see my irritability index! A little higher and . . . ah . . . I feel rather twitchy. Do you happen to have any curare around?'

"He looked at me as if I had just stabbed him with a hatpin, and then pulled out the fluoroscope so fast it almost ran over him, screened my arm bones and hustled me out of there before I could even say aha. Apparently the idea of my throwing a fit right there didn't arouse his professional ardor one bit.

"Alec, when I saw those bone shadows it was as much as I could do to keep from frightening the poor boy with war whoops. I put both arms under together, and I couldn't see any bumps at all. *They were exactly the same.*

"This means that cells retain wider gene blueprints than they need. And they just need a little encouragement

to rebuild injuries according to specifications. Regeneration must be an unused potential of the body. I don't see why. We can't evolve *unused* abilities. Natural selection only works in life and death trials—probably evolution had no part in this. It is just a lucky break from being fetal apes, a hang-over bit of arrested development.

"I wonder how wide a blueprint each cell retains. Can a hand sprout new fingers, a wrist a new hand, a shoulder a new arm? Where does the control stop?

"The problem is a natural for the data I am getting now. Next winter when I am through with this silly rejuvenation business I'll get down to some solid work on regeneration, and try sprouting new arms on amputees. Maybe we can pry a grant from the Government, through that military bureau for the design of artificial limbs. After all, new legs would be the artificial limbs to end all artificial limbs.

"But that is all for next year. Right now all I can use it for is to speed up replacement. If I can kid my cells into moving up onto embryo level activity—they would regrow fast enough to keep the inside works ticking after a really stiff jolt of that bottled dissolution. I'd have to follow it fast with the liquid protein—No, if they regrew that fast they would be using the material from the dissolved old cells. It could telescope treatment down to a few hours. And the nucleus control so

active that it rebuilds according to its ideal.

"Demolition and Reconstruction going on simultaneously. Business as Usual.

"Next step is the replacement of various soft tissues. If I were not in such a hurry, I would do it in two long slow simple Ghandi-like fasts, with practically no scientific mumbo jumbo. The way a sea squirt does it I mean—though I'd



like to see someone starve himself down to a foot high.

"I have to start working now. The record is funning out anyhow, so good-by until the next record, whenever that is.

"Having wonderful time.

"Wish you were here."

He took the record off hurriedly and put on the next one. It was recorded on only one face, and dated September 17th about fifty days later, seven weeks.

Helen started speaking without any introduction, her voice clearer and more distant as if she were speaking a few feet from the microphone.

"I'm rather upset Alex. Something rather astonishing has happened. Have to get you up to date first.

"The fasting treatment went fine. Of course I had to stay indoors and keep out of sight until I was fit to be seen. I'm almost back to normal now, gaining about a pound a day. The embryo status treatment stimulated my cells to really get to work. They seem to be rebuilding from an adult blueprint and not a fetal one, so I am getting flesh again in proper proportion and not like an overgrown baby.

"If I am talking disjointedly it is because I am trying hard not to get to the point. The point is too big to be said easily.

"Of course you know that I started this experimenting just to

check my theoretical understanding of cell metabolism. Even the best available theory is sketchy, and my own guesses are doubtful and tentative. I never could be sure whether a patient recovered because of my treatment, in spite of my treatment—or just reacted psychosomatically to the size of my consultant fee.

"The best way to correct faulty theory is to carry it to its logical absurdity, and then to use the silliness as a clue to the initial fault.

"Recipe: To test theories of some process take one neutral subject—that's me—and try to induce a specific stage of that process by artificial means dictated by the theories. The point of failure will be the clue to the revision of the theories.

"I expected to spend the second half of my vacation in the hospital, checking over records of the experiment, and happily writing an article on the meaning of its failure.

"To be ready for the emergency I had hitched one of the electric timer clocks to the dictaphone and the telephone. If I didn't punch it at five-hour intervals, the alarm would knock off the telephone receiver, and the dictaphone would yell for an ambulance.

"Pinned to a big sign just inside the door was an explanation and full instructions for the proper emergency treatment. At every step in the experiment I would rewrite the instructions to match. 'Be Prepared' was the motto. 'Plan for every contingency.' No matter when the experiment decided to blow up in my

face, I would be ready for it.

"There was only one contingency I did not plan for.

"Alec, I was just looking in the mirror. The only mirror that is any good is the big one in the front bedroom, but I had put off looking into it. For a week I lounged around reading and sleeping on the lab cot and the chair beside the window. I suppose I was still waiting for something to go wrong, but nothing did, and the skin of my hands was obviously different—no scars, no calluses, no tan, just smooth pink translucent skin—so I finally went and looked.

"Then I checked it with a medical exam. You'll find that data in with the other medical notes. Alec, I'm eighteen years old. That is as young as an adult can get.

"I wonder how Aladdin felt after rubbing a rusty lamp just to polish it up a bit.

"Surprised I suppose. The most noticeable feature of this new face so far is its surprised expression. It looks surprised from every angle, and sometimes it looks pale, and alarmed.

"Alarmed. Einstein was not alarmed when he discovered relativity, but they made a bomb out of it anyhow. I don't see how they could make a bomb out of this, but people are a wild, unpredictable lot. How will they react to being ageless? I can't guess, but I'm not reckless enough to hand out another Pandora's box to the world. The only safe way is to keep the secret until you get back, and then call a

quiet council of experts for advice.

"But meanwhile, what if one of our friends happens to see me on the street looking like eighteen years old? What am I supposed to say?

"It is hard to be practical, darling. My imagination keeps galloping off in all directions. Did you know your hair is getting thin in back? Another two years with that crew cut and you would have begun to look like a monk.

"I know, I know, you'll tell me it is not fair for you to be a juvenile when every one else is gray, but what is fair? To be fair at all everyone will have to have the treatment available free, for *nothing*. And I mean *everyone*. We can leave it to an economist to worry out how. Meanwhile we will have to change our names and move to California. You don't want people to recognize you, and wonder who I am, do you? You don't want to go around looking twice as old as your wife and have people calling you a cradle snatcher, now do you?

"Wheedling aside, it is fair enough. The process is still dangerous. You can call yourself Guinea Pig Number Two. That's fair. We can sign hotel registers G. Igpay and wife. Pardon me, Alec, I digress. It is hard to be practical, darling.

"If the treatment gets safely out of the lab and into circulation—rejuvenation worked down to a sort of official vaccination against old age—it would be good for the race I think. It may even help evolution. Regen-

eration would remove environmental handicaps, old scars of bad raising, and give every man a body as good as his genes. A world full of the age proof would be a sort of sound-mind, sound-body health marathon, with the longest breeding period won by the people with the best chromosomes and the healthiest family tradition.

"Thank heavens I can strike a blow for evolution at last. Usually I find myself on the opposite side, fighting to preserve the life of some case whose descendants will give doctors a headache.

"And look at cultural evolution! For the first time we humans will be able to use our one talent, learning, the way it should be used, the way it was meant to be used from the beginning; an unstoppable growth of skill and humor and understanding, experience adding layer on layer like the bark of a California Redwood.

"And we need thinkers with time to boil the huge accumulation of science down to some reasonable size. It is an emergency job—and not just for geniuses, the rest of us will have to help look for common denominators, too. Even ordinary specialists will have time to learn more, do some integrating of their own, join hands with specialists of related fields.

"Take us, a good sample of disjointed specialties. You could learn neurology, and I could learn anthropology and psychology, and then we could talk the same language and

still be like Jack Spratt and his wife, covering the field of human behavior between us. We would be close enough to collaborate—without many gaps of absolute ignorance—to write the most wonderful books. We could even . . . ah—We *can* even—"

(There was a silence, and then a shaky laugh.)

"I forgot," I said, "Take us for example," as if we weren't examples already. Research is supposed to be for other people. This is for us. It is a shock. Funny—funny how it keeps taking me by surprise.

"It shouldn't make that much difference. After all one lifetime is like another. We'll be the same people on the same job—with more time. Time enough to see the sequoias grow, and watch the ripening of the race. A long time.

"But the outside of the condemned cell is not very different from the inside. It is the same world full of the same harebrained human beings. And yet here I am, as shaky as if I've just missed being run over by a truck."

(There was another uncertain laugh.)

"I can't talk just now, Alec. I have to think."

For some minutes after the record stopped Alec stared out of the window, his hands locked behind his back, the knuckles working and whitening with tension. It was the last record, the only clue he had. The quaver in her voice, her choice of words, had emphatically filled his

mind with the nameless emotion that had held her. It was almost a thought, a concept half felt, half seen, lying on the borderline of logic.

Before his eyes persistently there grew a vision of the great pyramid of Cheops, half completed, with slaves toiling and dying on its slopes. He stared blindly out over the rooftops of the city, waiting, not daring to force the explanation. Presently the vision began to slip away, and his mind wandered to other thoughts. Somewhere down in that maze of buildings was Helen. Where?

It was no use. Unclenching his stiffening fingers Alec jotted down a small triangle on the envelope of the record, to remind himself that a pyramid held some sort of clue. As he did it, suddenly he remembered that Helen, when she was puzzled, liked to jot the problem down on paper as she thought.

On the bedroom vanity table there was a tablet of white paper, and beside it an ashtray holding a few cigarette stubs. The tablet was blank, but he found two crumpled sheets of paper in the wastebasket and smoothed them carefully out on the table.

It began "Dear Alec" and then there were words crossed and blotted out. "Dear Alec" was written again halfway down the sheet, and the letters absently embroidered into elaborate script. Under it were a few doodles, and then a clear surrealistic sketch of a wisdom tooth marked with neat dental work, lying on its side in the foreground of a desert.

Subscribed was the title "TIME", and beside it was written critically, "Derivative: The lone and level sands stretch far away." Doodles and vague figures and faces covered the bottom of the page and extended over the next page. In the midst of them was written the single stark thought "There is something wrong."

That was all. Numbly Alec folded the two sheets and put them into the envelope of the record. A tooth and a triangle. It should have been funny, but he could not laugh. He took the record out and considered it. There was another concentric ribbon of sound on the face of the disk. Helen had used it again, but the needle had balked at a narrow blank line where she had restarted the recorder and placed the stylus a little too far in.

He put the record back on the turntable and placed the needle by hand.

"Alec darling, I wish you were here. You aren't as good a parlor psychologist as any woman, but you do know human nature in a broad way, and can always explain its odder tricks. I thought I was clever at interpreting other people's behavior, but tonight I can't even interpret my own. Nothing startling has happened. It is just that I have been acting unlike myself all day and I feel that it is a symptom of something unpleasant."

"I walked downtown to stretch my legs and see the crowds and bright lights again. I was looking at the

movie stills in a theater front when I saw Lucy Hughes hurrying by with a package under one arm. I didn't turn around, but she recognized me and hurried over.

"Why Helen Berent! I thought you were in Tibet."

"I turned around and looked at her. Lucy, with her baby ways and feminine intuition. It would be easy to confide in her but she was not the kind to keep a secret. I didn't say anything. I suppose I just looked at her with that blank expression you say I wear when I am thinking.

"She looked back, and her eyes widened slowly.

"Why you're too young. You're not—Heavens! I'm awfully sorry. I thought you were someone else. Silly of me, but you look just like a friend of mine—when she was younger I mean. It's almost uncanny!"

"I put on a slight western drawl, and answered politely, as a stranger should, and she went away shaking her head. Poor Lucy!"

"I went in to see the movie. Alec, what happened next worries me. I stayed in that movie eight hours. It was an obnoxious movie, a hard-boiled detective story full of blood and violence and slaughter. I saw it three and a half times. You used to make critical remarks on the mental state of a public that battens on that sort of thud and blunder—something about Roman circuses. I wish I could remember how you explained it, because I need that explanation. When the movie house closed for the night

I went home in a taxi. It drove too fast but I got home all right. There was some meat stew contaminated with botulism in the icebox, but I tasted the difference and threw it out. I have to be very careful. People are too careless. I never realized it before, but they are."

"I had better go to bed now and see if I can get some sleep."

Automatically Alec took the record off and slid it back into its envelope. The penciled triangle caught his eye, and his hands slowed and stopped. For a long time he looked at it without moving—the pyramids, the tombs of kings. An ancient religion that taught that one of a man's souls lived on in his mummy, a ghostly spark that vanished if the human form was lost. A whisper of immortality on earth. Cheops, spending the piled treasures of his kingdom and the helpless lives of slaves merely for a tomb to shield his corpse, building a pitiful mountain of rock to mock his name down the centuries. Hope—and fear.

There are wells of madness in us never tapped.

Alec put away the record and stepped to the window. The brown towers of Columbia Medical Center showed in the distance. Cornell Medical was downtown, Bellevue—"Hope" said Alec. "When there is life there is hope," said Alec, and laughed harshly at the pun. He knew now what he had to do. He turned away from the window, and picking up a classified telephone di-

rectory, turned to "Hospitals".

It was evening. The psychiatric resident doctor escorted him down the hall talking companionably.

"She wouldn't give her name. Part of the complex. A symptom for us, but pretty hard on you. It would have helped you to find her if she had some identifying marks I suppose, like scars I mean. It is unusual to find anyone without any—"

"What's her trouble?" asked Alec. "Anxiety? Afraid of things, germs, falls—?"

"She's afraid all right. Even afraid of me! Says I have germs. Says I'm incompetent. It's all a symptom of some other fear of course. These things are not what she is really afraid of. Once we find the single repressed fear and explain it to her—" He checked Alec's objection. "It's not rational to be afraid of little things. Those little dangers are not what she is really afraid of anyhow. Now suppression—"

Alec interrupted with a slight edge to his voice.

"Are you afraid of death?"

"Not much. There is nothing you can do about it, after all, so normal people must manage to get used to the idea. Now she—"

"You have a religion?"

"Vedanta. What of it? Now her attitude in this case is—"

"Even a mouse can have a nervous breakdown!" Alec snapped. "Where is the repression there? Vedanta you said? Trouble is, Helen is just

too rational!" They had stopped. "Is this the room?"

"Yeah," said the doctor sullenly, making no move to open the door. "She is probably still asleep." He looked at his watch. "No, she would be coming out of it now."

"Drugs," said Alec coldly. "I suppose you have been psychoanalyzing her, trying to trace her trouble back to some time when her mother slapped her with a lollipop, eh? Or shock treatment perhaps, burning out the powers of imagination, eh?"

The young psychiatrist let his annoyance show. "We know our jobs, sir. Sedatives and analysis, without them she would be screaming the roof off. She's too suspicious to consciously confide her warp to us, but under scopolamine she seems to think she is a middle-aged woman. How rational is *that*?" With an effort he regained his professional blandness. "She has not said much so far, but we expect to learn more after the next treatment. Of course being told her family history will help us immeasurably. We would like to meet her father and mother."

"I'll do everything in my power to help," Alec replied. "Where there is life there is hope." He laughed harshly, on a note that drew a keen professional glance from the doctor. The young man put his hand to the knob, his face bland.

"You may go in and identify her now. Remember, be very careful not to frighten her." He opened the door and stood aside then followed Alec in.

Helen lay on the bed asleep, her dark hair lying across one cheek. She looked like a tired kid of nineteen, but to Alec there seemed to be no change. She had always looked this way. It was Helen.

The doctor called gently. "Miss . . . ah . . . Berent, Miss Berent."

Helen's body stiffened, but she did not open her eyes. "Go away," she said in a small flat voice. "Please!"

"It is just Dr. Marro," the young man said soothingly.

"How do I know you are a doctor?" she said without stirring. "You'd say that anyway. Maybe you escaped and disguised yourself as a doctor. Maybe you are a paranoid."

"I'm just myself," said the resident, shrugging. "Just Dr. Marro. How can I prove it to you if you don't look at me?"

The small voice sounded like a child reciting. It said: "If you are a doctor, you will see that having you here upsets me. You won't want to upset me, so you will go away." She smiled secretly at the wall. "Go away please."

Then, abruptly terrified, she was sitting up, staring, "You called me Miss Berent. Oh, Alec!" Her eyes dilated like dark pools in a chalk face, and then Helen crumpled up and rolled to face the wall, gasping in dry sobs. "Please, please—"

"You are exciting her, Mr. Berent," said the resident. "I'm sorry, but I'm afraid you'll have to leave."

It had to be done. Alec swallowed with a dry mouth, and then said in a loud clear voice, enunciating every syllable:

"Helen, honey, you are dying."

For a moment there was a strange silence. The doctor was looking at him with a shocked white face; then he moved, fumbling for an arm lock, fumbling with his voice for the proper cheerful tone. "Come, Mr. Berent, you . . . we must be going now."

Alec swung his clenched fist into the babbling white face. The jolt on his knuckles felt right. He did not bother to watch the doctor fall. It only meant that he would have a short time without interruption. Helen was cowering in the far corner of the bed, muttering "No-no-no-no—" in a meaningless voice. The limp weight of the psychiatrist leaned against his leg and then slipped down and pressed across the toes of his shoes.

"Helen," Alec called clearly, "Helen, you are dying. You have cancer."

She answered only with a wordless animal whimper. Alec looked away. The gleaming white walls began to lean at crazy angles. He shut his eyes and thought of darkness and silence. Presently the whimpering stopped. A voice faltered: "No, I am never going to d— No, I am not."

"Yes," he said firmly, "you are." The darkness ebbed. Alec opened his eyes. Helen had turned around and was watching him, a line of puz-

zlement on her forehead. "Really?" she asked childishly.

His face was damp, but he did not move to wipe it. "Yes," he stated, "absolutely certain. Cancer, incurable cancer."

"Cancer," she murmured wonderingly. "Where?"

He had that answer ready. He had picked it from an atlas of anatomy as an inaccessible spot, hard to confirm or deny, impossible to operate for. He told her.

She considered for a second, a vague puzzlement wrinkling her face. "Then . . . I can't do anything about it. It would happen just the same. It's there now." She looked up absently, rubbing a hand across her forehead. "The deadline?"

"It's very small and encysted." Casually he waved a hand. "Maybe even ten-twenty years."

Thinking, she got out of bed and stood looking out the window, her lips pursed as if she were whistling.

Alec turned to watch her, a polite smile fixed on his lips. He could feel the doctor's weight shifting as his head cleared.

"Cells." Helen murmured, once, then exclaimed suddenly to herself. "Of course not!" She chuckled, and chuckling spoke in her own warm voice, the thin note of fear gone. "Alec, you'll never guess what I have been doing. Wait until you hear the records!" She laughed delightedly. "A wild goose chase! I'm ashamed to face you. And I didn't see it until this minute."

"Didn't see what, honey?"

The doctor got to his knees and softly crawled away.

Helen swung around gayly. "Didn't see that all cells are mutable, not just germ cells, but all cells. If they keep on multiplying—each cell with the same probability of mutation—and some viable mutations would be cancerous, then everybody — Work it out on a slide rule for me, Hon, with so many million cells in the body, with—"

She had been looking past him at the new idea, but now her gaze focused and softened. "Alec, you look so tired. You shouldn't be pale after all your tramping around in—" The mists of thought cleared. She saw him. "Alec, you're back."

And now there was no space or time separating them and she was warm and alive in his arms, nuzzling his cheek, whispering a chuckle in his ear. "And I was standing there lecturing you about cells! I must have been crazy."

He could hear the doctor padding up the hall with a squad of husky attendants, but he didn't care. Helen was back.

*From too much love of living
From hope and fear set free
We thank with brief thanksgiving
Whatever gods may be
That no life lives for ever;
That dead men rise up never;
That even the weariest river
Winds somewhere safe to sea.*

Swinburne

THE END

BOOK REVIEWS

"A Martian Odyssey And Others,"
by Stanley G. Weinbaum. Fantasy
Press, Reading, Pa. 289 p. 1949.
\$3.00.

"A Martian Odyssey" was one of those "impact" stories which are immediately recognizable as something new, and which often start schools of their own—in this case the "screwy animal" school. There have been times, before and since, when science fiction seemed to be largely made up of screwy animals—call them BEM's, if you like—but from the moment we met Weinbaum's ostrichlike little Martian, Tweel, we knew that this was different. These creatures belonged in the weird settings their creator had devised for them, and most important of all, the development of the story grew out of their characteristics.

Fantasy Press has brought together some of the best of Weinbaum's short stories in one of the best books it has yet published. There are both Tweel stories—the second something of a letdown, though it earns the jacket illustration—the van Manderpootz gadgets such as the subjunctivisor, the idealizator, and the attitudinizer, the "Ham" Hammond stories from this maga-

zine, and several others, notably "The Mad Moon" which appeared here just before its author's untimely death. Here is the Lotus-Eater, Oscar, ultimate in vegetative intellectuality, and here are Weinbaum's most diabolically suggestive creations, the slinkers, and their close rivals in pure evil, the trioptes.

To me, these stories seem better and more skillfully written than Weinbaum's more ambitious "Black Flame" stories, or "The New Adam", which he considered his best work. After fifteen years they still have a freshness which the other stories lack. They are and will continue to be fun to read. Remembering how Weinbaum's contemporaries, such as Jack Williamson, have matured and developed we can only imagine what this talented author might have done had he remained one of Astounding's "stable" and lived to try his talents fully.

P. Schuyler Miller

"The Science And Engineering Of Nuclear Power," Vol. II, edited by Clark Goodman, Addison-Wesley Press, Boston, Mass., 317 pp., \$7.50.

Volume II of this work—Vol. I was reviewed in the September, 1948, issue of ASF—consists of seventeen chapters on divers subjects relating to the theory and practice of nuclear power. These chapters range from descriptive material on source materials for nuclear power and health physics to highly mathematical articles on pile theory.

Of special interest to readers of *Astounding SCIENCE FICTION* are the chapters on "Rockets and Other Termal Jets Using Nuclear Energy," and "Future Developments in Nuclear Energy."

The first of these, written by Hsue-Shen Tsien, of MIT, is quite optimistic as to the possibility of building an atomic powered rocket—in contrast to one of the chapters in Vol. I. Dr. Tsien first of all derives the relativistic equations of motion of a rocket, a step which is necessary in considering rockets which may have very great exhaust velocities. It is quickly shown that the permissible temperature in the motor is the limiting factor in the design.

The problem is that of the essential difference in the order of magnitude of nuclear phenomena and molecular phenomena. In other words, the molecules of the motor just can't exist in the presence of the temperatures that would accompany a pure U-235 rocket. The compromise solution is to make use of a nuclear pile to heat up a mass of hydrogen gas whose expansion provides the thrust. The pile which Dr. Tsien designs is in the form of tapered tubes having

porous walls of one eighth inch thickness made of a mixture of U-235, U-238, and carbon. The gas is heated to about 3000°C. by being forced through these tubes, producing a thrust of two thousand six hundred tons in a rocket weighing one thousand five hundred sixty tons initially.

The maximum velocity of this rocket, fired vertically, neglecting air resistance, is about five point one miles per second. While one thousand five hundred sixty tons makes a very hefty rocket, a method is outlined by which this weight should eventually be cut down to the neighborhood of one hundred tons.

So we have here, designed on paper at least, a nuclear rocket which is nearly capable of reaching the moon! (Don't let anybody kid you about seven miles per second being the escape velocity for a rocket. By the time you get up to five miles per second you are already up two thousand miles, and you'll keep going as far as you want.)

The chapter on future developments, by Clark Goodman, is more prosaic in character, dealing with power plants for aircraft, submarines, and big cities. These are treated strictly as engineering problems. There is also a discussion of sources of fissionable material, pointing out that all of the high-grade ore in the United States known to the public would supply all our power by nuclear means for only one year. The possibility of producing new fuels by breeding of new isotopes is dis-

cussed as a method of improving the situation. The synthesis of helium from hydrogen as a power source is not considered very feasible, but, ending upon an optimistic note, Dr. Goodman remarks: "In spite of these theoretical observations, it is not only possible but probable that as the nature of nuclear forces becomes understood, improved methods will be developed for releasing a larger and larger fraction of the mass energy stored in atomic nuclei."

Milton A. Rothman

"Triton," by L. Ron Hubbard; Fantasy Publishing Co., Inc., Los Angeles; 172 pages; \$3.

When this yarn originally appeared in the April '40 *Unknown* it was known as "The Indigestible Triton," by René Lafayette. Hubbard has now come out from behind his nom de plume, and the "Indigestible" has been dropped. For a period of a few days, while the story was at the linotypist's, a title change to "Man Eats Monster" was contemplated. But any way you look at it, this will be a book that fans of the whimsy school of fantasy will eat up.

Hubbard must have borrowed Thorne Smith's typewriter to tell this tall salt tale. It is down to the sea in quips, now frothy as an ocean wave, now stormy as a briny squall.

Bill Greyson, who has been posing as insane to avoid an undesirable marital match, escapes from a Florida

sanitarium and goes fishing. He inadvertently hooks Trigon, grandson of Triton, invisible demigod of the vastly deep. Trigon literally crams himself down Greyson's throat, in revenge, and the fun is on!

"Triton," in retrospect, is a kind of other-track predecessor of Science Fiction's recent "Needle," in that another creature lives in internal symbiosis with a human being. In "Triton," however, the tale is told strictly for laughs; i.e., when Hubbard calls a character an 'eel,' it's definitely on porpoise!

Greyson finds it difficult to demonstrate he is *not* loco in the koko when his unseen host speaks from his interior. But if his troubles are thus doubled on land, they are trebled when Trigon forces him to dive beneath the sea into a realm where men are about as welcome as fishhooks. Greyson gets into hot water on the ocean's bottom, and it takes an audience with Neptune himself to get himself surfaced again. Topside, Greyson ingeniously convinces the concerned parties that his incredible behavior while inhabited by the Triton was all mass hypnotism. But the reader will discover one amusingly inexplicable piece of evidence to the contrary.

The novel is augmented by a science fiction short, "The Battle of Wizards," reprinted from Fantasy Book, about a future contest, far out on the galaxy's rim, between humanoid magic and terrestrial science.

Weaver Wright

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ERGODIC PREDICTION

BY J. J. COUPLING

This Special Feature concerns a most remarkable method of mechanically generating propaganda. As anyone can plainly see, the method is absolutely reliable; it is extremely unfortunate that we do not have one of these machines. Or don't we . . . ?

ASF articles have always kept the readers up to date, but more recently Isaac Asimov and Philip Latham seem to have scooped the press. Surely it is only with trepidation that one should venture further. Research, however, is research, and an honest reporter shouldn't fear the truth.

The truth in this case is that scientists have become interested in prophecy. What else, indeed, is a gun director but a mechanical prophet which acts on its convictions? It predicts where an airplane will be at a given time, and it gets results.

Now, the deeper theory of how it does this would be almost too much even for a reader of ASF. Indeed, a thick wartime report on the subject by Dr. Norbert Wiener of cyber-

netics fame was called the "Yellow Peril" after the color of its cover and the nature of its contents. It may not have floored as many Americans as the Japs did, but it made a lot of engineers realize that they weren't as smart as they had thought.

Of course, the trouble with all of this scientific prophecy is that it can't predict what *will* happen. All it can say is what is likely to happen on the basis of consistencies in past behavior. The assumption is that the future statistics of the process whose course we are to prophesy will be the same as the statistics observed in the past. Roughly, if this is so the process is what is called an ergodic one, and for such processes, techniques of prediction have been developed.

Work by Dr. Claude E. Shannon,

ASTOUNDING SCIENCE-FICTION

for instance*, shows that to some degree at least written English can be regarded as an ergodic process, and, indeed, some of the statistics of English text are well known to cryptographers.

All this leads up to the sample of English test at the close of this article. I obtained this material from a man who is interested in cybernetics, communication theory and prediction. According to his ideas, it may at best be regarded as a plausible ordering of the letters of the alphabet. Whether it is a prediction in a common sense can, of course, be settled only by waiting until the date of the dateline.

Washington, April 1, 1950

Hitler's most deadly secret weapon, with which he hoped to the last to win the war, was revealed in Washington today by a Nazi scientist. The weapon is known to the Russians and may be in use in this country.

Dr. Hagen Krankheit told reporters that he had smuggled the secret of the top Nazi weapon into this country. The weapon was known only to himself, two technicians who were executed before the fall of Berlin, Joseph Goebbels and the Fuehrer himself. Dr. Krankheit gained access to this country after the war in the guise of a rocket engineer. Recently he has been threatened with expulsion as a dangerous alien.

The weapon, known as the Müllabfuhrwortmaschine, is a complex de-

vice for writing propaganda with great flexibility and subtlety. In appearance it much resembles a large digital computer such as the ENIAC or the MANIAC, Dr. Krankheit said. A few key words and instructions are put in and the device automatically produces propganda in limitless quantity, using all possible combinations and, unlike a human being, overlooking none.

A prominent scientist said that he believed such a machine to be possible, and that it had been partly anticipated in the work of Dr. Norbert Weiner of The Massachusetts Institute of Technology and Dr. Claude Shannon of the Bell Telephone Laboratories. He did not know of any such machine in this country, he said, but admitted that he did not read the papers.

Dr. Krankheit said that the original primitive idea for the machine had been stolen from the Russians by espionage early in the Nazi regime. He insisted that the German machine was a Nazi development; but admitted that the Russians might be using a similar device. Dr. Krankheit hinted that such a machine might be in operation in this country, but he refused to give particulars.

Although the original machine was of almost infinite complexity, the fundamental principle is simple. Dr. Krankheit demonstrated this with three sets of cards. On one set of cards were written phrases called "entities", on another phrases called "operators" and on a third more "entity" phrases. By shuffling each set

*C. E. Shannon, "A Mathematical Theory of Communication," *Bell System Technical Journal*, January, 1948.

of cards and dealing out one card from each propaganda is produced.

Dr. Krankheit demonstrated the cards by producing such statements as:

"Subversive elements were revealed to be related by marriage to a well-known columnist."

"Capitalist warmonger is a weak link in atomic security."

"Atomic scientist is said to be associated with certain religious and racial groups."

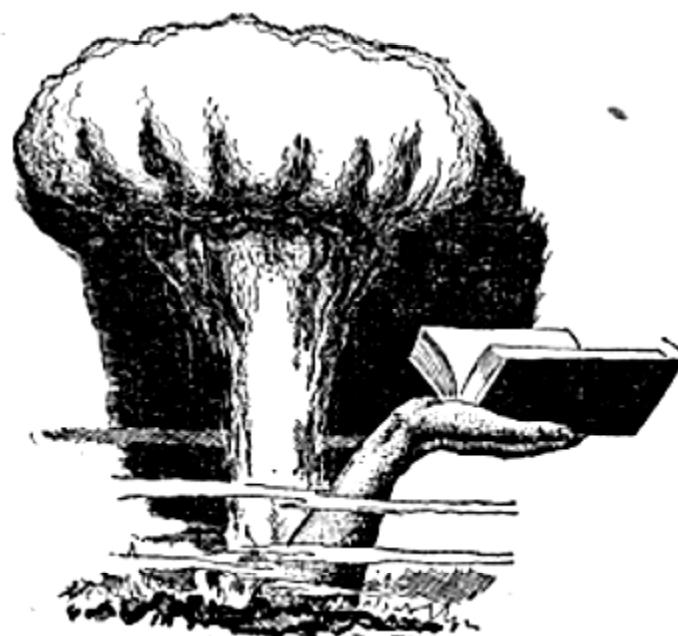
The actual machine, Dr. Krankheit revealed, could produce whole pages of propaganda suitable for immediate distribution. This was delivered either in printed form or directly as spoken words interspersed with martial and patriotic music. The machine could be adjusted to associate any group with various favorable or unfavorable groups or qualities in any desired degree. Dr. Krankheit said that the problem of making the output reasonably con-

nected had been solved only after immense labor, but had been made easier by the fact that propaganda does not have to make sense as long as it achieves its objective.

A committee spokesman scouted the idea that there is such a machine in use in this country. He commented in part: "This is an effort by fellow travelers to undermine confidence in the American way of life. We have evidence of a weak link in military security. Government laxness must be called to account. The F.B.I. should investigate all subversive elements."

A Russian spokesman indignantly denied that his country would use such a device. "This is a capitalist warmongering plot," he said. "Russia stands for true democracy. The degraded and beastly tools of Wall Street will defeat themselves." He added that the machine's true inventor was an as yet unnamed Russian scientist.

THE END



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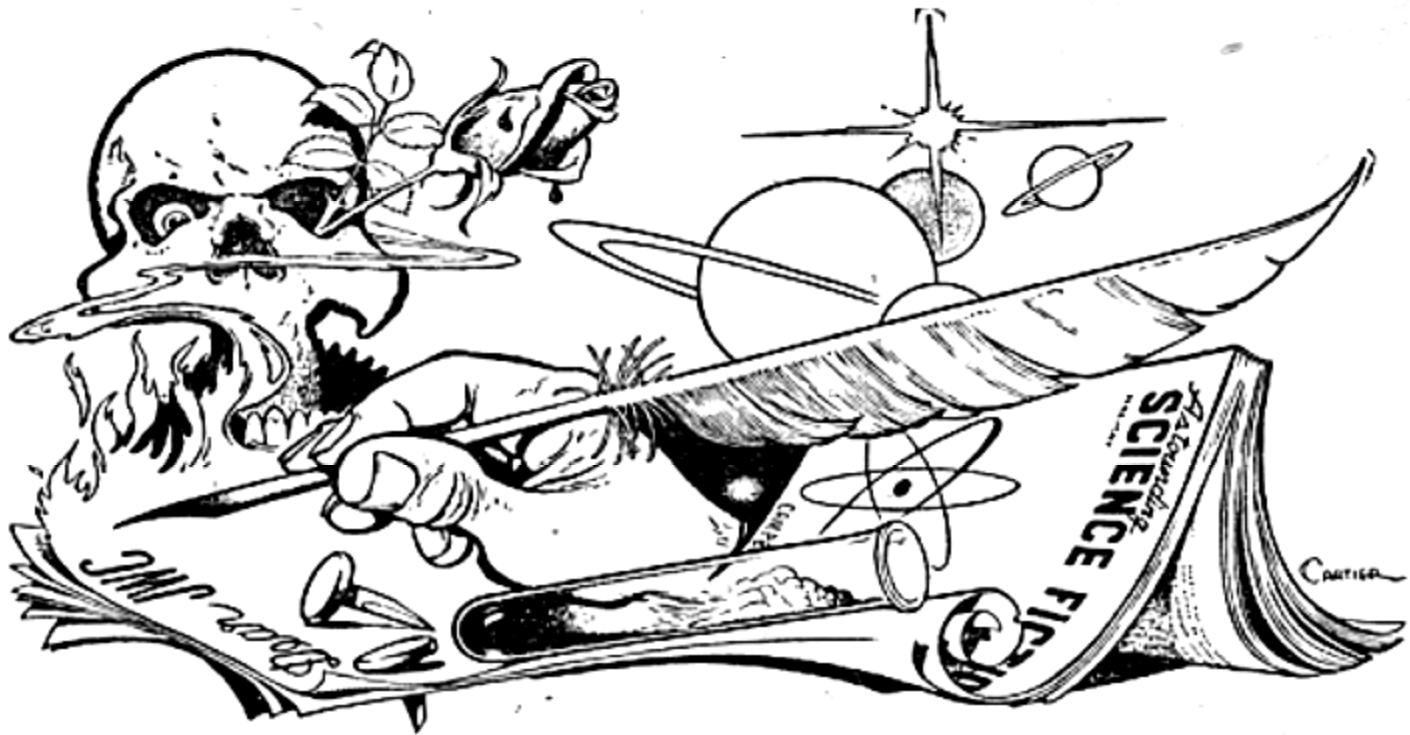
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BRASS TACKS

*Hear ye! Hear ye! Court is now
in session!*

Dear Mr. Campbell:

In the Supreme Court of Science-Fiction in and for the English-speaking people of Earth:

A Great Admirer

vs.

John W. Campbell

and

ASTOUNDING
SCIENCE-
FICTION

COMPLAINT

Comes now Your Petitioner in the above entitled action and for a complaint alleges:

I. That the publication, Astounding SCIENCE-FICTION, is the most interesting magazine appearing

in this century, that its writings possess great and peculiar value for all lovers of science-fiction, and that its ability to portray the genus homo in all his moods, amounts to a veritable genius.

II. That Astounding SCIENCE-FICTION is a monthly publication so welcome in Your Petitioner's home that he can hardly wait for the month to go by till the next issue arrives, bringing with it, as it does, readable stories and articles of timely importance.

III. That the stories of Heinlein, Sturgeon, Williamson, and Russell are so interestingly written, their plots so unique and fascinating, that Your Petitioner's standard and taste for science-fiction have been greatly

raised; that he is no longer able to enjoy other stories in magazines which previously afforded him entertainment, and that, in fact, one half of other publications from the reading of which he heretofore derived pleasure now appear to him weary, stale, flat and unprofitable.

Wherefore, Your Petitioner prays that Mr. Campbell act cumoirously; that the aforementioned authors continue to appear in Astounding SCIENCE-FICTION; and should the editor desire to attain even greater heights of uniqueness, it is humbly suggested that the work of Ray Bradbury be occasionally included in said publication.—Michael Storm, Petitioner, 3304 Bonnie Lane, Stockton, California.

Guess we can't even keep up these days—let alone get ahead of the game! However, the calculator having the greatest known capacity, already in quantity production, is the twelve billion relay calculator in your skull!

Dear Mr. Campbell:

I've just been reading the article entitled "Electrical Mathematicians" from a recent issue of your publication. It certainly was a most extensive exposition of calculating in its various forms but I am rather amazed to note that the author is apparently some five years behind the times in the matter of IBM developments along these lines.

He refers to the IBM Automatic Sequence Controlled Calculator at Harvard as "Perhaps the fanciest

digital computing machine today." Actually, the IBM Automatic Sequence Controlled Calculator was completed by this company in 1944.

In January 1948 this company dedicated the IBM Selective Sequence Electronic Calculator which has approximately 250 times the capacity of the machine IBM gave to Harvard. The IBM Selective Sequence Electronic Calculator also has the largest capacity and largest actual production of any calculators now in operation. In the meantime, IBM also has produced several commercial machines embodying electronic principles, and these are the only commercial electronic calculating and accounting machines available today.

I am forwarding to you a copy of the brochure issued when the IBM Selective Sequence Electronic Calculator was introduced and also copies of literature on all of our electronic business machines.

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"Thank you" note!

Dear Mr. Campbell:

When I wrote you the letter you

published in the August issue of ASF I had certainly not expected what has resulted from that. I have been simply overwhelmed by old issues of ASF and offers to send more. I had to answer many of the writers that I had already accepted so many offers that I could not take them all up and so had to refrain from using theirs.

I am really flabbergasted by the kindness of your readers and want to thank you also for the fact that you put my letter in. The first I knew of that was when the letters started coming in, because I had not got my August copy yet. The copies you send me are arriving rather irregularly so that I received the August and September issues within ten days of each other. And that is the reason I'll give you lab reports on both in this letter.

August :

1. "Trojan Horse Laugh".
2. "A Matter of Matter".
3. "P Plus".
4. "Letter to a Phoenix".
5. "The Queen of Zamba".

September :

1. "The Double-Dyed Villains".
2. "Hide and Seek".
3. "Special Jobbery".
4. "The Queen of Zamba".

I did like some parts of "Progress Report", but thought other parts rather weak.—J. J. Hillen, Jonkerlaan 21, Wassenaar, Netherlands.

We had never added up that story total. Didn't realize that twenty

full years of publication came to quite such an impressive total!

Mr. Campbell :

There was an exceptionally good selection of science-fiction in the October issue. I welcome the return of Raymond F. Jones, after his absence from the fiction pages of *Astounding* covering a period of two years and two months. I also note the return of Chan Davis after his absence of two years and four months from the pages of ASF.

Here is my evaluation of the contents of October's issue :

1st Place : Hubbard's "The Auto-magic Horse"

Hubbard's word pictures of his three new creations : Gadget O'Dowd, Angus McBane, and Tony Marconi, the space-aspiring trio were given in his inimitable style of crisp clarity, and reality. The already clever plot of the electromechanical Stardust was further enriched by the tantalizing threads of a potential sequel plot dealing with the shapes of future adventures in deep space of this genial threesome. This novelette is literally bidding for sequels, and I am certainly looking forward to them.

2nd Place : Jones' "Production Test"

For a while there, I thought the intense cold of space and the resulting brittleness of the metal of Kimberly's springs in the spring-compensated joints, were the factors involved in the cause of the spread-eagling in the suits ; but as I read on, the hint

of the "ghost" whistling coupled with a fact I had read about in a certain science article concerning ultra-high sound frequency phenomena gave me the answer to the riddle at just about the same time as Kimberly found out himself in his space-chamber. I am giving this second place because of the pleasant way a scientific fact was coupled with good story telling.

3rd Place: Anderson's "Time Heals"

Though the concept of a Stasis-field time traveling machine is not new, the psychological thesis embedded in the story is the contributing factor to the success of this tale. The story in itself is complete, and the ending is logically constructed,

yet an interesting sequel could be given.

4th Place: Locke's "The Finan-seer"

Locke couldn't get away from his article style in this, his first published fiction attempt in Astounding. Yet the story was neatly hung on the skeleton framework of some interesting game-theory.

5th Place: MacLean's "Defense Mechanism"

A good opening was that clever analogy between Ted and Jake's brains with electronic circuits, an opening which subtly paved the way for the rather unfortunate result in the story's conclusion.

6th Place: Davis' "The Aristocrat"

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Somehow I just couldn't muster up enough enthusiasm for the causes of either the Folks, or Elders. I had the distinct impression of hearing the author sigh in boredom as he thrashed out some of the numerous flat, tasteless paragraphs that spottet the story. The lecture in genetics of the Folks-Elders relations is the only thing I wish to retain from the story.

7th Place : Neville's "Cold War"

Up, up the ladder of mounting suspense and anxiety at the neatly drawn situation of World-shattering importance I went—and hung. "Where was the profound problem," I asked myself, as I finished the last line. Surely, those unstable characters in the space stations should immediately be replaced by electronically controlled mechanisms, receiving their instructions via electromagnetic ties from a central station in the States, on Earth. The central station could be operated by a self-checking crew of technicians. Still, could we get to those stations in time to effect my plan—

The two articles were very good. "Chance Remarks" was fortuitously(?) placed in the same issue with the man (R. F. J.) who paved the foundation of the ideas of the semantic selector in an earlier story in Astounding.

Excellent cover. By far the best this year.

That Brass Tacks headpiece: Keep it.

Number of stories published in Astounding so far: 1315.—Rudolph W. Preisendorfer, 23 Fayette Street,

Cambridge 39, Massachusetts.

Shiras just isn't a story-a-month writer. There are more coming up; just give us a chance!

Dear Mr. Campbell:

Just a rear-rank private registering a kick. Been reading Astounding for a long time now and I sincerely believe it to be tops in its field. I read them all—and that's my judgment. Comes now the kick. Last November, or thereabouts, you had a story by a new author, Wilmar H. Shiras, which was tops with me. In March you ran a second story, "Opening Doors", which the reading audience indicated they liked, too. Since then I've looked with drooling appetite as each issue made its belated appearance—but no Shiras. What I wanna know is—why? Hope this very fine writer is still functioning and that we will have the pleasure of other stories by him. If the guy is still living, ask him to get the lead out. Six months is more than enough to let his fans wait, sitting on the edges of their chairs. Since he's got them in the habit, he owes 'em more stories. We all—I think I'm really speaking for the fans—want to know more about Tim and Dr. Welles and the Kid Geniuses they were uncovering. It's gonna DO something to me if I don't get any more of those stories. I'll sue somebody for acute frustration!—C. W. Van Tilburg, 4313 Sixth St., South, Arlington, Virginia.

PROMISED LAND

BY LAWRENCE O'DONNELL

Man has learned many tricks to make his environment fit his needs. There is another approach—better, perhaps, but full of blind alleys...

Illustrated by Cartier

People got out of Fenton's way as he walked scowling through the palace, heading for the great steel doors that only half a dozen men in the Unit knew how to open. Fenton was one of the half dozen. The pale scar that made a zigzag like lightning across his dark cheek pulled his face awry a little as he snapped an angry command into the intercom.

A voice murmured apologetically out of it: "Sorry, he's busy right now. If you'll—"

Fenton slapped his palm with ringing fury against the metal beside the intercom. The echoing metallic boom rang like thunder down the hall behind him, where courtiers, diplomats and politicians waited their chance for an audience with the Protector of Ganymede.

"Open these doors!"

There was another pause. Then

the voice murmured something again, and the great steel doors slid softly apart a few feet. Fenton stalked through, hearing them thud together behind him, shutting off the sound of whispering, angry and curious, that had begun to fill the hall.

He went through an antechamber and into a tall-columned room shaped like a well, with a dome of starry sky very far overhead. (It was day outside, on Ganymede, and thick, eternal clouds shut out the sky, but if a man is wealthy enough he can arrange to have the stars reflected into his palace if he wants them.)

In the center of the room, under the sky dome, stood the Protector's water bed where his five-hundred-pound bulk swallowed luxuriantly. Like truth, the monstrous man floated at the bottom of his well and watched the stars.

He was not looking at them now. Great billows of lax flesh stirred on his cheeks as he grinned cavernously at the newcomer.

"Patience, Ben, patience," he said in his deep rumble. "You'll inherit Ganymede in due time—when it's habitable. Be patient, even—"

Fenton's angry glance dropped to the man sitting on the raised chair beside the water bed.

"Get out," he said.

The man stood up, smiling. He stooped a little, standing or sitting, as though his big-boned frame found even the scanty weight of flesh it carried burdensome. Or maybe it was the responsibilities he carried. He had a gaunt face and his eyes, like his hair, were pale.

"Wait," the monster in the tank said. "Bryne's not finished with me yet, Ben. Sit down. Patience, son, patience!"

Fenton's right hand jerked doorward. He gave Bryne a cold glance.

"Get out," he said again.

"I'm no fool," Bryne remarked, turning away from the water bed. "Apologies, Protector, and so on. But I'd rather not be in the middle. Ben seems upset about something. Call me when it's safe." He shambled off, was lost behind the pillars. The sound of his footsteps died.

Fenton drew a deep breath to speak, his dark face flushing. Then he shrugged, sighed and said flatly: "I'm through, Torren. I'm leaving."

The Protector swallowed as he

raised an enormous hand. Gasping with the effort, he let it fall back into the dense, oily liquid of his bath.

"Wait," he said, panting. "Wait."

The edge of the bath was studded with colored buttons just under the water level. Torren's gross fingers moved beneath the surface, touching buttons deftly. On a tilted screen above the tank snow fields flickered into view, a road threading them, cars sliding flatly along the road.

"You've just come from the village," Torren said. "You've talked to Kristin, I suppose. You know I lied to you. Surprised, Ben?"

Fenton shook his head impatiently.

"I'm leaving," he said. "Find yourself another heir, Torren." He turned away. "That's all."

"It isn't all." The Protector's deep voice had command in it. "Come back here, Ben. Patience is what you want, my boy. Patience. Spend thirty years in a water bed and you learn patience. So you want to walk out, do you? Nobody walks out on Torren, son. You ought to know that. Not even my inheritor walks out. I'm surprised at you. After I've taken so much trouble to change a whole world to suit your convenience." The vast cheeks wrinkled in a smile. "It isn't thoughtful of you, Ben. After all I've done for you, too."

"You've done nothing for me," Fenton told him, still in the flat voice. "You picked me out of an orphanage when I was too young to protect myself. There's nothing you can give me I want, Torren."



"Getting dainty, aren't you?" the man in the water demanded with what sounded like perfect good humor. "I'm surprised at you, Ben. So you don't want the Torren empire, eh? Ganymede wouldn't be good enough for you, even when I make it habitable, eh? Oh, Ben, come to your senses. I never thought you'd go soft on me. Not after what you've been through."

"You put me through plenty," Fenton said. "I grew up the hard way. It wasn't worth it, Torren. You wasted your time. I tell you I'm finished."

"The tenderizing light of a good woman's eyes has reformed you," Torren mocked. "Pretty little Kristin changed your mind, I suppose. A charming creature, Kristin. Only a foot taller than you, too, my

boy. Only a hundred pounds heavier, I expect. But then she's young. She'll grow. Ah, what a pity I never met a really good woman when I was your age. Still, she'd have had to weigh five hundred pounds, to understand me, and such women never really appealed to my aesthetic tastes. You should have seen the charming little things in the Centrifuge, Ben. They're still there, you know—the ones who haven't died. I'm the only Centrifuge baby who got out and stayed out. I made good. I earned enough to stay out."

The monstrous head fell back and Torren opened his vast mouth and roared with laughter. The oily liquid in the bath heaved in rhythmic tides and echoes of his mirth rolled along the pillars and up the well toward the stars, rolled up the walls

that had imprisoned Torren since his birth. They were walls he himself had burst apart against odds no man had ever before encountered.

"*You* grew up in a hard school," Torren laughed. "*You!*"

Fenton stood silent, looking at the monstrous being in the bath, and the anger in his eyes softened a little in spite of himself. The old respect for Torren stirred in his mind. Tyrant the man might be, ruthless autocrat—but had ever man such reason to be pitiless before? Perhaps in very ancient times when, for profit, skilled practitioners warped and broke the bodies of children to make them valuable freaks and monsters for the entertainment of royalty. Perhaps then, but not again, until the planets were opened for colonization three hundred years ago.

Fenton had seen the Threshold Planetaria, back on Earth, the fantastic conditioning units where eugenics, working through generation after generation of selected stock, bred humans who could sustain themselves in the ecology of other worlds. He knew little about these remarkable experiments in living flesh. But he did know that some of them had failed, and one such Planetarium had held Torren—thirty years ago.

"Thirteen generations," Torren said deliberately, drawing the familiar picture for him again, relentlessly as always. "Thirteen generations one after another, living and dying in a Centrifuge that increased

its rotation year after year. All those treatments, all those operations, all that time under altered radiations, breathing altered air, moving against altered gravity—until they found out they simply couldn't breed men who could live on Jupiter, if they took a thousand generations. There was a point beyond which they couldn't mutate the body and keep intelligence. So they apologized." He laughed again, briefly, the water surging around him in the tank.

"They said they were sorry. And we could leave the Centrifuge any time we wanted—they'd even give us a pension. Five hundred a month. It takes a thousand a day to keep me alive outside the Centrifuge!"

He lay back, spent, the laughter dying. He moved one vast arm slowly in the fluid.

"All right," he said. "Hand me a cigarette, Ben. Thanks. Light—"

Holding the igniter for him, Fenton realized too late that Torren could have got his own cigarette. There was every possible convenience, every luxury, available to the water bed. Angrily Fenton swung away, paced to and fro beneath the screen upon which the snow fields were reflected. His fingers beat a tattoo on his thigh. Torren waited, watching him.

At the far end of the screen, without turning, Fenton said quietly: "So it was bad in the Centrifuge, Torren? How bad?"

"Not bad at first. We had something to work toward. As long as we thought our descendants could

colonize Jupiter we could stand a lot. It was only after we knew the experiment had failed that the Centrifuge was bad—a prison, just as our bodies were a prison."

"But you'd shut the Ganymedans up in a place like that."

"Certainly," Torren told him. "Of course I would. I'd shut you up, or anyone else who stood in my way. I owe the Ganymedans nothing whatever. If there's any debt involved, the human race owes *me* a debt that can never be repaid. Look at me, Ben. Look!"

Fenton turned. Torren was raising his gigantic arm out of the water. It should have been an immensely powerful arm. It had the potential muscle. It had the strong, bowed bone and the muscles springing out low down along the forearm, as the Neanderthal and the gorilla's did. And Torren had a gorilla's grip—when he did not have to fight gravity.

He fought it now. The effort of simply lifting the weight of his own arm made his breath come heavily. His face darkened. With tremendous struggle he got the arm out of the water as far as the elbow before strength failed him. The uselessly powerful arm crashed back, splashing water high. Torren lay back, panting, watching his sodden cigarette wash about, disintegrating in the tank.

Fenton stepped forward and plucked it out of the water, tossed it aside, wiped his fingers on his sleeve. His face was impassive.

"I don't know," he said. "I don't know if that debt ever can be discharged. But, you're trying hard."

Torren laughed. "I need the money. I always need money. There aren't enough Ganymedans to develop the planet. That's all there is to it. With the ecology changed, normal humans can live here within ten years."

"They'll be able to live here in another hundred and fifty years anyhow, if plantings and atmospherics follow the program." By then the Ganymedans will adapt—or at least, their great-grandchildren will. That was the original plan."

"Before I got control, yes. But now *I* give the orders on Ganymede. Since Jensen isolated Jensenite out there," and he nodded toward the snowy screen, "everything's changed. We can speed up the plantings a hundred percent and the air ought to be breathable in—"

"Jensen's a Ganymedian," Fenton broke in. "Without Jensen you'd never have been able to break the original agreement about changing over. You owe the Ganymedans that much for Jensen's sake alone."

"Jensen will get paid. I'll finance him to an ambulatory asylum on any world he chooses. I owe the others nothing."

"But they're all in it together!" Fenton slapped the edge of the tank angrily. "Don't you see? Without the whole Ganymede Threshold experiment you'd never have had Jensenite. You can't scrap every Ganymedian except Jensen now! You—"

"I can do as I please," Torren declared heavily. "I intend to. Gany-mede is an unimportant little satellite which happens to belong to me. I hate to mention it, son, but I might say the same thing about you. Benjamin Fenton is an unimportant young man who happens to belong to me. Without my influence you're nothing but a cipher in a very large solar system. I've invested a lot of money and effort in it and I don't intend to throw it away. Just what do you think you'd do if you left me, Ben?"

"I'm a good organizer," Fenton said carefully. "I know how to handle people. I've got fast reflexes and dependable judgment. You toughened me. You gave me some bad years. You arranged for me to kill a few people—in line of duty, naturally—and I've done your dirty jobs until I know all the ropes. I can take care of myself."

"Only as long as I let you," Torren told him with a faintly ominous ring in the deep voice. "Maybe it was a whim that made me pick you out of the asylum. But I've invested too much in you, Ben, to let you walk out on me now. What you need is work-hardening, my boy." He cupped water in his hand and let it drain out. "Who was it," he inquired, "that said no man is an island? You're looking at an island, Ben. *I'm* an island. A floating island. No one alive has any claim on me. Not even you. Don't try me too far, Ben."

"Have you ever thought I might

kill you some time, Torren?" Fenton asked gently.

The colossus in the tank laughed heavily.

"I ran a risk, making you my heir," he admitted. "But you won't kill me to inherit. I made sure. I tried you. You were given chances, you know . . . no, I don't think you did know. I hardened you and toughened you and gave you some bad years, and some men might want to kill me for that. But not you. You don't hate me, Ben. And you're not afraid of me. Maybe you ought to be. Ever think of that, Ben?"

Fenton turned and walked toward the door. Between two pillars he paused and glanced back.

"I nearly killed you thirteen years ago," he said.

Torren slapped his palm downward, sending a splash of liquid high.

"You nearly killed me!" he said with sudden, furious scorn. "Do you think I'm afraid of death? When I wasn't afraid to *live*? Ben, come back here."

Fenton gave him a level look and said, "No."

"Ben, that's an order."

Fenton said, "Sorry."

"Ben, if you walk out of this room now you'll never come back. Alive or dead, Ben, you'll never come back."

Fenton turned his back and went out, through the anteroom and the great steel doors that opened at his coming.

Stooping above the open suitcase on his bed, both hands full, Fenton saw the slightest possible shadow stirring in reflection on the window before him and knew he was not alone in the room. No buzzer had warned him, though the full spy-beam system was on and it should have been impossible for anyone to pass unheralded.

He lifted his head slowly. Beyond the broad window the snowy hills of Ganymede lay undulating to the steep horizon. The clouds that blanketed the world were blue-tinged with Jupiter-light, reflecting from Jupiter's vast bright-blue seas of liquid ammonia. Between two hill-tops he could see one of the planting-valleys veiled in mist, dull turquoise warm by contrast with the snow. The reflection swam dimly between him and the hills.

Without turning he said: "Well, Bryne?"

Behind him Bryne laughed.

"How did you know?"

Fenton straightened and turned. Bryne leaned in the open doorway, arms folded, sandy brows lifted quizzically.

"You and I," Fenton said in a deliberate voice, "are the only men who know most of the rabbit-warren secrets in this Unit. Torren knows them all. But it had to be you or Torren, obviously. You know how I knew, Bryne. Are you trying to flatter me? Isn't it a waste of time, now?"

"That depends on you," Bryne said, adding thoughtfully a moment

later, "—and me, of course."

"Go on," Fenton said.

Bryne shifted his gaunt body awkwardly against the door.

"Do you know what orders Torren gave me an hour ago? No, of course you don't. I'll tell you. You're not to be admitted to him again even if you ask, which I told him you wouldn't. You're not to take anything out of the Unit except the clothes you wear, so you can stop packing. Your accounts have been stopped. All the money you're to have is what's in your pocket. This suite is out of bounds as soon as you leave it." He glanced at his wrist. "In half an hour I'm to come up here and escort you to Level Two. You eat with the repair crew and sleep in the crew dormitory until Thursday, when a freighter is due in at the spaceport. You'll sign on with the crew and work your way back to Earth." Bryne grinned. "After that, you're on your own."

Fenton touched his scarred cheek meditatively, gave Bryne a cold glance.

"I'll expect you in half an hour, then," he said. "Good-by."

Bryne stood up straighter. The grin faded.

"You don't like me," he said, on a note of sadness. "All the same, you'd better trust me. Half an hour's all we have now. After that I pass over into my official capacity as the Protector's representative, and I'll have to carry Torren's orders out. He thinks you need work-hardening. I may find myself finagling you into

a slave-contract in the Underlands."

"What do you suggest?" Fenton asked, folding another shirt.

"That's better." Bryne dropped a hand into his pocket, stepped forward, and tossed a thick packet of money onto the bed. Beside it he dropped a key and a folded ticket, bright pink for first-class.

"A ship leaves six hours from now for Earth," Bryne said. "There's a tractor car waiting in the gully at the foot of G-Corridor. That's its key. Torren keeps a close watch on all the Corridors, but the system's complex. Now and then by accident one of the wiring devices gets out of order. G-Corridor's out of order right now—not by accident. How do you like it, Fenton?"

Fenton laid the folded shirt into place, glanced at the money without expression. He was thinking rapidly, but his face showed nothing.

"What do you stand to gain, Bryne?" he asked. "Or is this one of Torren's subtler schemes?"

"It's all mine," the gaunt man assured him. "I'm looking toward the future. I'm a very honest man, Fenton. Not direct—no. You can afford to be direct. I can't. I'm only an administrator. Torren's the boss. Some day you'll be boss. I'd like to go on being an administrator then, too."

"Then this is by way of a bribe, is it?" Fenton inquired. "Waste of time, Bryne. I'm stepping out. Torren's probably rewriting his will already. When I leave Ganymede I leave for good. As if you didn't know."

"I know, all right. Naturally. I've already been notified to get out the old will. But I'll tell you, Fenton—I like administering Ganymede. I like being cupbearer to the gods. It suits me. I'm good at it. I want to go on." He paused, giving Fenton a keen glance under the sandy lashes. "How much longer do you think Torren has to live?" he inquired.

Fenton paused in his methodic packing. He looked at Bryne.

"Maybe a year," Bryne answered his own question. "Maybe less. In *his* condition he ought to be glad of it. I'm thinking about afterward. You and I understand each other, Fenton. I don't want to see the Torren holdings broken up. Suppose I keep the will that names you inheritor and tear up the new one Torren's going to make today? Would that be worth anything to you?"

Fenton looked out over the snow toward the turquoise valley where Kristin would be scattering yellow seeds into the furrows of the ploughed Ganymedian soil. He sighed. Then he stooped and picked up the money, the ticket and the key.

"You'll have to take my word for it," he said, "that it would be. But I wish I understood why you're really doing this. I thought you and Torren got along better than that."

"Oh, we do. We get along fine. But—Fenton, he scares me. I don't know what makes him tick. Funny things are happening to the human race these days, Fenton." Unexpected sincerity showed on the gaunt

face in the doorway. "Torren . . . Torren isn't human. A lot of people aren't human any more. The important people aren't."

He swung a long arm toward the turquoise valley. "The Threshold people are getting the upper hand, Fenton. I don't mean here. I don't mean literally. But *they're* the inheritors of the future, not us. I guess I'm jealous." He grinned wryly. "Jealous, and a little scared. I want to feel important. You and I are human. We may not like each other much, but we understand each other. We can work together." He drew his shoulders together with a small shiver. "Torren's a monster, not a man. You know it, now. I know why you quarreled. I'm glad of it."

"I'll bet you are," Fenton said.

When it was safe, he drove the tractor car down the gorge between high banks of snow, rolling as fast as he dared toward the turquoise valley. The Ganymedian landscape framed in the square window openings all around him looked like so many television images on square screens. Probably some of it really was framed upon screens, back there in the Unit whose mile-square walls fell farther and farther behind as the tractor treads ground on.

Probably Torren's screen, tilted above the water bath, reflected some such landscape as this. But there were often tractor cars trundling along the snowy roads. Unless Torren had reason to suspect, he was not

likely to focus too sharply upon this one. Still, Fenton knew he would feel more comfortable after he had passed beyond the range of the 'visor. Not that Torren couldn't summon up a picture of any Ganymedian area he happened to feel curious about. The thing was to keep his curiosity asleep, until the time came to rouse it.

The cold hills swung by. The heavy air swirled a little as the car spun along, making eddies like paradoxie heat waves between Fenton and the road. No man could live without an insulated suit and breathing-apparatus on the surface of Ganymede—yet. But the specially bred Ganymedans from the Threshold Planetarium could.

When men first reached the planets they found their thresholds fatally different from Earth. They began to alter the planets, and to alter the men. This after one whole wasted generation in which they tried to establish colonies that could be supported from Earth and could operate from artificial shelters. It didn't work. It never worked, even on Earth, when men tried to create permanent colonies in alien lands without subsisting on the land itself.

There is more to it than the lack of bread alone. Man must establish himself as a self-sustaining unit on the land he works, or he will not work it long. Neither humans nor animals can subsist or function efficiently on alien territory. Their metabolism is geared to a different ecology, their digestive organs demand a different food, melancholia



and lassitude overcome them eventually. None of the great bonanza ventures on the mineral-rich planets ever came to successful production because agriculture could not keep up with them and they collapsed of their own weight. It had been proved true time and again on Earth, and now on the planets the old truism repeated itself.

So the Threshold Planetaria were set up and the vast experiment got under way. And they altered the planets as well as the stock that was to possess them.

Ganymede was cold. The atmosphere of heavy gases could not sustain human life. So with atomic power and technological weapons man began to alter the ecology of Ganymede. Through the years the temperature crept gradually up from the deadly level of a hundred degrees below centigrade zero. Wastefully, desperately, the frozen water was released, until a cloud-blanket began to form over Ganymede to hold in the heat.

There were many failures. There were long periods of inactivity, when the insulated domes were deserted. But as new methods, new alloys, new isotopes were developed, the process became more and more practical. When the final generation of Ganymede-slanted stock was bred, Ganymede was ready for them.

Since then, three generations had become self-sustaining on the satellite. They could breathe the air—though men could not. They could endure the cold—though men could

not. They were taller than men, sturdier and stronger. There were several thousand of them now.

As they had driven along a genetic parabola to meet the rising parabola of an altered planetary balance, so now the Ganymedans and Ganymede together followed a new curve. In a few more generations it would circle back to meet normal humanity. By that time, Ganymede should be habitable for Earthmen, and by then Ganymedans should have altered once more, back toward the norm.

Perhaps the plan was not the best possible plan. Humanity is not perfect. They made many errors, many false guesses, when the Age of Technology began. Balance of power among the nations of Earth influenced the development of the Threshold Planetaria. Social conflicts changed and shifted as civilization found new processes and methods and power-sources.

Fenton thought of Torren. Yes, there had been many errors of judgment. The children of Torren should have walked like giants upon a free planet, Centrifuge-bred colossi. But that experiment had failed. Not even upon tiny Ganymede could Torren use the tremendous strength inherent in his helpless body to stand upright.

It was easier to work eugenically with animals. In the new Ganymedian seas, still growing, and on the frigid Ganymedian continents, were creatures bred to breathe the atmosphere—arctic and subarctic creatures, walrus and fish, snow-rabbit and

moose. Trees grew on Ganymede now, mutated tundra spread across the barrens, supplemented by the photosynthesis laboratories. A world was being born.

And across the world marched the heat-giving, life-giving towers built over a hundred-year period by the Earth government, still owned by Earth, not to be touched even by Torren, who owned Ganymede. Fenton swung the tractor over the brow of the hill and paused for an instant to look west. A new tower was rising there, one of hundreds, to supplement the old towers with a new method of speeding up changes. Within ten years these snowy hills might ripple with wheat—

The road forked here. One way led toward the valley. The other lay like a long blue ribbon across the hilltops, dipping suddenly as the horizon dipped toward the spaceport and the ship that was headed for home.

Fenton touched the scar on his cheek and looked at the spaceport road. Earth, he thought. And then? He thought of Bryne's wise, gaunt face, and of Torren wallowing in his water bed that was linked like the center of a spider's web with every quarter of the mile-square Unit and every section of the little globe it stood on. No, not a spider web—an island. A floating island with no link that bound him to humanity.

Fenton spoke one furious word and wrenched violently at the wheel. The car churned up snow in a blinding haze and then leaped forward

along the right-hand road, down toward the turquoise mist that hid the valley.

An hour later he came to the village called Providence.

The houses were of local stone, with moss-thatched roofs. Early experiments with buildings of metal, plastics and imported wood had been discarded, as might be expected, in favor of indigenous materials. For life on Ganymede no houses proved quite so satisfying as houses built of Ganymede stone.

The people came mostly of hardy Norse stock, with Inuit and other strains mingled for the desirable traits. The Ganymedans who came out into the snow-powdered street when Fenton stopped his car were an entirely new race. An unexpectedly handsome race, since they had certainly not been bred for beauty. Perhaps much of their good looks sprang from their excellent health, their adjustment to their lives and their world, the knowledge that the world and the work they did upon it were both good and necessary. Until now.

A big yellow-haired man in furs bent to the window of the car, his breath clouding the heavy air which no normal human could breathe.

"Any luck, Ben?" he asked, his voice vibrating through the diaphragm set in the side of the car. It was only thus that a Ganymedan could speak to an Earth-born human. Their voices had to filter to each other through carbon dioxide air and

metal and rubber plates. It meant nothing. There are higher barriers than these between human minds.

"About what you expected," Fenton told him, watching the diaphragm vibrate when sound struck it. He wondered how his own voice sounded, out there in the cold air heavy-laden with gases.

Yellow heads and brown nodded recognition of what he meant. The tall people around the car seemed to sag a little, though two or three of them laughed shortly, and one big woman in a fur hood said:

"Torren's fond of you, Ben. He must be, after all. Maybe—"

"No," Fenton told her positively. "He's projected himself in my image, that's all. I can walk around. But I'm simply an extension, like an arm or a leg. Or an eye. And if Torren's eye offends him—"

He broke off abruptly, slapped the steering wheel a couple of times and looked ahead of him down the wide, clean street lined with clean, wide-windowed houses that seemed to spring from the rock they stood on. They were strong houses, built low to defy the blizzard winds of Ganymede. The clear, wide, snowy hills rolled away beyond the rooftops. It was a good world—for the Ganymedans. He tried to think of these big, long-striding people shut up in asylums while their world slowly changed outside the windows until they could no longer breathe its air.

"But, Ben," the woman said, "it isn't as if people *needed* Ganymede.

I wish I could talk to him. I wish I understood—"

"Have you any idea," Fenton asked, "how much Torren spends in a year? People don't need living room on Ganymede, but Torren needs the money he could get if . . . oh, forget it. Never mind, Marta."

"We'll fight," Marta said. "Does he know we'll fight?"

Fenton shook his head. He glanced around the little crowd.

"I'd like to talk to Kristin," he said.

Marta gestured toward the slope that led down into the farmland valley.

"We'll fight," she said again, uncertainly, as the car started. Fenton heard her and lifted a hand in salute, grinning without mirth or cheerfulness. He heard the man beside her speak as the car drew away.

"Sure," the man said. "Sure. What with?"

He knew Kristin as far as he could see her. He picked her figure out of the fur-clad group dark against the snow as they stepped out of the road to let the car go by. She waved as soon as she recognized him behind the glass. He drew the car to a halt, snapped on the heating units of the insulated suit he wore, closed the mask across his face and then swung the car door open. Even inside the mask his voice sounded loud as he called across the white stillness.

"Kristin," he said. "Come over here. The rest of you, go on ahead."

They gave him curious glances, but they nodded and trudged on down the hill toward the valley. It seemed odd to watch them carrying hoes and garden baskets in the snow, but the valley was much warmer below the mist.

Kristin came toward him, very tall, moving with a swift, smooth ease that made every motion a pleasure to watch. She had warm yellow hair braided in a crown across her head. Her eyes were very blue, and her skin milk-white below the flush the cold had given it.

"Sit in here with me," Fenton said. "I'll turn off the atmosphere unit and leave the door open so you can breathe—for a while."

She stooped under the low door and got in, folding herself into the too-small seat. Fenton always felt out of proportion beside these big, friendly, quiet people. It was their world, not his. If anyone were abnormal in size here, then it was he, not the Ganymedans.

"Well, Ben?" she said, her voice coming with a faint vibration through the diaphragm in his helmet. He smiled back at her and shook his head. He did not think he was in love with Kristin. It would be preposterous. They could not speak except through metal or touch except through glass and cloth. They could not even breathe the same air. But he faced the possibility of love, and grinned ironically at it.

He told her what had happened, exactly as it took place, and his mind

began to clarify a little as he talked.

"I suppose I should have waited," he said. "I can see that, now. I should have kept my mouth shut until I'd been back on Ganymede at least a month, sounding things out. I guess I lost my temper, Kristin. If I'd only known, while I was still back on Earth . . . if you could only have written—"

"Through the spaceport mail?" she asked him bitterly. "Even the *incoming* letters are censored now."

He nodded.

"So the planets will go on thinking we *asked* for the change-over," she said. "Thinking we failed on Ganymede and *asked* to be shut up in asylums. Oh, Ben, that's what we all hate worst of all. We're doing so wonderfully well here . . . or we were, until—" She broke off.

Fenton touched the button that started his motor and turned the car around so they could look out across the broad plain below. They faced away from the Unit, and except for blurs of turquoise mist here and there where other warm valleys breathed out moisture and the exhalation of growing things there was no break in the broad sweep of snowy hills—the towers marching in a long row across the planet.

"Does he know we'd die in the asylums?" Kristin asked.

"Would you?"

"I think we would. Many of us would. And I think we'd never have any more children. Not even the idea of having great-great-grandchil-

dren who might be able to walk on Ganymede again would keep the race alive. We wouldn't kill ourselves, of course. We wouldn't even commit race-suicide. We won't want to die—but we won't want to live, either—in asylums."

She twisted on the smooth car seat and looked anxiously at Fenton through the glass of his respirator.

"Ben, if the planets knew—if we could get word outside somehow—do you think they'd help? Would anyone care? I think some might. Not the Earth-bred, probably. They wouldn't really *know*. But the Thresholders would know. For their own safety, Ben, I think they might *have* to help us—if they knew. This

could happen to any Threshold group on any world. Ben—"

A blue shadow gliding across the snow caught her eye and she turned her head to watch it.

Then concussion heeled the car over—

Dimly Fenton heard metal rip around him against rocks hidden under the snow they ploughed through. In the echoing immobility while the vehicle hung poised, before it settled back, he tasted blood in his mouth and felt Kristin's weight heavy against his shoulder, saw the black outlines of his own hands with fingers spread, pressing the glass against the whiteness of snow.

The car smashed over the edge,

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jolting downward on its treads, down faster and more roughly with each jolt. The winged blue shadow wheeled back and sailed over them again.

The silhouetted hands moved fast. Fenton was aware of them turning, pulling, gripping numbly at levers they scarcely felt. The idling motor exploded into a roar and the car sprang forward, straight down the unbroken slope.

Then the second blast came.

The rear of the vehicle lifted, hurling Fenton and the girl against the cushioned panel and the thick, shatterproof windshield, which released its safeties under the impact and vanished in a whirl of brightness somewhere outside. The treads screamed as the car ground across bare rock and snow boiled up in a whirlwind around them. The car shot forward again to the very edge of the slope and hung tottering over a hundred-foot drop beyond.

There was a timeless interval of what felt like free fall. Fenton had time to decide that his instinct had been right. The fall was the safer choice. The car's interior was braced and shock-absorbent, and they would survive a drop better than another bomb-hit.

Then they struck the ground, whirled out, struck again, in an increasing avalanche of ice and rock and snow. The shocks changed to the thunder of bombs, and then absolute darkness and silence without echo.

Neither of them could have survived alone. It took Kristin's Ganymedan strength and vitality and the resilience that had kept her from serious injury, plus Fenton's knowledge of mechanics and his fierce, devouring anger.

Buried thirty feet under a solid, freezing mass of debris, Fenton whipped the girl with words when even her hardiness began to fail. With one arm broken, he drove himself harder still, ignoring the shattered bone, working furiously against time. Enough air was trapped in the loose snow to supply Kristin, and Fenton's respirator and suit were tough enough to survive even such treatment as this.

The mercury-vapor turbine that generated the car's power had to be repaired and started anew. It took a long time. But it was done. What Fenton wanted was the tremendous thermal energy the exhaust would give them. Very slowly, very carefully, using a part of the turbine sheath as a shield, they burned their way to the open air.

Twice settling rock nearly crushed them. Once Kristin was pinned helpless by the edge of the shield, and only Fenton's rage got them through that. But they did get through. When only a crust remained, Fenton carefully opened small view-cracks in the shadow, and waited until he was sure no hovering helicopter still waited. Then they broke through and climbed free.

There were signs in the snow

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where a copter had landed and men had walked to the edge of the abyss, even climbed part of the way down.

"Who was it, Ben?" Kristin asked, looking down at the footprints. When he did not answer, "Ben—your arm. How bad—"

He said abruptly, not listening to her: "Kristin, I've got to get back to the Unit. Fast."

"You think it was Torren?" she asked fearfully. "But, Ben, what could you do? If—"

"Torren? Maybe. Maybe Bryne. I'm not sure. I've got to *be* sure. Help me, Kristin. Let's go."

"To the village first, then," she said firmly, setting her marble-hard forearm beneath his elbow to steady him. "You'll never make it unless we patch you up first. Would Torren really do a thing like that to you, Ben? The nearest thing to a son he'll ever have? I can't believe it."

The dry snow squeaked underfoot as they climbed the hill.

"You don't know Torren," Fenton said. He was breathing unevenly, in deep gasps, partly from pain, partly from weariness, mostly because the air in the respirator was not coming fully enough to supply his increased need. But the outer air was pure poison. After awhile he went on, the words laboring a little.

"You don't know what Torren did to me, thirteen years ago," he said. "Back on Earth. I was sixteen, and I wandered out one night in one of the old Dead Ends—the ruined

cities, you know—and I got myself shanghaied. At least, that's what I thought for three years. One of the gangs who work the ruins got me. I kept thinking Torren's men would find me and get me out. I was young and naive in those days. Well, they didn't find me. I worked with the gang. For three years I worked with them. I learned a lot. Things that came in handy afterward, on some of the jobs Torren had for me—

"When I was tough enough, I finally broke away. Killed three men and escaped. Went back to Torren. You should have heard him laugh."

Kristin looked down at him doubtfully. "Should you be talking, Ben? You need your breath—"

"I want to talk, Kristin. Let me finish. Torren laughed. He'd engineered the whole thing. He wanted me to learn pro-survival methods right at the source. Things he couldn't teach me. So he arranged for me to learn from—experts. He felt that if I was capable I'd survive. When I knew enough, I'd escape. Then I'd be a tool he could really use. Work-hardening, he called it."

Fenton was silent, breathing hard, until he got enough breath to finish. "After that," he said, "I was Torren's right hand. His legs. His eyes. I was Torren. He'd put me into an invisible Planetarium, you see—a Centrifuge like the thing he grew up in, the thing that made him into a monster. That's why I understand him so well." He paused for a mo-

ment, swiped vainly at the face-plate as if to wipe away the sweat that ran down his forehead. "That's why I've got to get back," he said. "Fast."

Only Torren knew all the secrets of the Unit. But Fenton knew many. Enough for his purpose now.

When the rising floor inside the column of the round shaft ceased its pressure against his feet, he stood quiet for a moment, facing the curved wall, drawing a deep breath. He grimaced a little as the breath disturbed his arm, splinted and strapped across his chest under his shirt. With his right hand he drew the loaded pistol from its holster and, swinging it from the trigger guard, used his thumb to find the spring hidden in the curved wall.

The spring moved. Instantly he swung the pistol up, the grip smacking into his receiving palm, his finger touching the trigger. The hollow pillar in which he stood slid half apart, and Fenton looked straight at Torren in his water bed.

He stood still then, staring.

The colossus had managed to heave himself up to a sitting position. The huge hands gripped the edge of the tank and, as Fenton watched, the great fingers curved with desperate fury on the padded rim. Torren's eyes were squeezed shut, his teeth bared and set, and the room was full of the sound of his harsh, wheezing breath.

The blind, gargoyle face hung motionless for an instant. Then Torren exhaled with a gasp and let go. There

was a tremendous wallowing splash as the Protector of Ganymede plunged back into the water bed.

Fenton's gaze lowered to the long strip of floor beside the bath where a row of tiles had been lifted to expose the intricate complex of wires leading into the banked controls by which Torren ruled his palace and his planet. The wires lay severed on the floor, tangled fringes of them ripped and cut and torn out. It was almost as much a mutilation as if Torren's actual nerve-fibres had been torn. He was as helpless as if they had been.

There was a table set up a little distance from the bath. The key wires in the flooring snaked across the tiles toward the table. Upon it a control box had been set up, and the audio and video devices which were Torren's ganglia.

At the table, his profile to Fenton, Bryne sat, his long, thin body humped forward intently, the pale eyes fixed upon his work. He had a privacy-mute on the microphone he held to his mouth and as he murmured his fingers played lightly with a vernier. He watched the green line ripple and convulse across the face of an oscilloscope. He nodded. His hand struck down quickly at a switch, closed it, opened another.

"Bryne!" The breathless bellow from the tank echoed among the pillars, but Bryne did not even glance up. He must have heard that cry a good many times already, since this phase of his work began.

"Bryne!"

The shouted name mounted in a roar of sound up the well to the star-reflections far above and reverberated to a diminishing whisper that blended with Torren's heavy breathing. Again the huge hands slid futilely over the rim of the tank.

"Answer me, Bryne!" he roared.
"Answer me!"

Bryne did not look up. Fenton took a step forward, onto the open floor. His eyes were hard and narrow. The blood had gone out of his face until the pale scar along his jaw was almost invisible. Torren, seeing him, gasped and was silent in the midst of another shout. The small eyes sunk in fat stared and then shut tight for an instant over a leap of

strange, glancing lights.

"Why don't you answer him, Bryne?" Fenton asked in an even voice.

Bryne's hands opened with a sudden, convulsive gesture, letting the microphone fall. After a long moment he turned an expressionless face to Fenton. The pale eyes regarded the gun muzzle and returned to Fenton's face. His voice was expressionless, too.

"Glad to see you, Fenton," he said.
"I can use your help."

"Ben!" Torren cried, a thick gasp of sound. "Ben, he's trying . . . that . . . that scum is trying to take over! He—"

"I suppose you realize," Bryne



said in a quiet voice, "Torren sent a helicopter to bomb you when he found you were getting away from him. I'm glad he failed, Fenton. We're going to need each other."

"Ben, I didn't!" Torren shouted. "It was Bryne—"

Bryne picked up the microphone again, smiling thinly.

"It's going to be perfectly simple, with your help, Fenton," he said, ignoring the heavy, panting gasps of the Protector in the tank. "I see now I might have taken you into my confidence even more than I did. This was what I meant when I told you Torren hadn't very much longer to rule. The chance came sooner than I expected, that's all."

"Ben!" Torren was breathing hard, but his voice was under more control now. He swallowed heavily and said: "Ben, don't listen to him. Don't trust him. He . . . he wouldn't even *answer* me! He wouldn't even pay any attention . . . as though I were a . . . a—" He gulped and did not finish. He was not willing to put any name to himself that came to his mind.

But Fenton knew what he meant. "As though I were a . . . monster. A puppet. A dead man." It was the horror of utter helplessness that had disarmed him before Bryne. For thirty years Torren had sought and claimed power by every means at his command, driven himself and others ruthlessly to combat the deepest horror he knew—the horror of helplessness. It was that which frightened him—not the fear of death.

"Don't waste your sympathy, Fenton," Bryne said, watching him. "You know Torren better than I do. You know what he planned for you. You know how he's always treated you. When he saw you escaping, he sent the 'copter to make sure you wouldn't get away. He isn't human, Fenton. He hates human beings. He hates you and me. Even now he'll play on your sympathy until he gets you to do what he wants. After that . . . well, you know what to expect."

Torren shut his eyes again, not quite soon enough to hide the little glitter of confidence, perhaps of triumph, in them. In an almost calm voice he said: "Ben, you'd better shoot him now. He's a plausible devil."

"Just what are your plans, Bryne?" Fenton asked in a level voice.

"What you see." Bryne's gaunt shoulders moved in a shrug. "I'll pretend he's ill, at first. Too ill to see anyone but me. This is a Maskelyne vodor I've got here. I'm working out a duplicate of his voice. It's a *coup d'état*, Fenton, nothing new. I've got everything planned thoroughly. I've done nine-tenths of the management of Ganymede for years now, anyhow. Nobody's going to wonder much. With your help, I can get the rest of the empire for us, too."

"And what about me?" Torren demanded thickly.

"You?" The pale eyes flickered

toward him and away. "As long as you behave, I suppose you can go on living." It was a lie. No falser statement of intent was ever spoken. You could tell it by the flat tone of his voice.

"And the Ganymedans?" Fenton asked.

"They're yours," Bryne said, still flatly. "You're the boss."

"Torren?" Fenton turned his head. "What do you say about the Ganymedans?"

"No," Torren breathed. "My way stands, Ben." His voice was an organ whisper. "My way or nothing. Make your choice."

The slightest possible flicker of a

smile twitched the corner of Fenton's lip. He swung his pistol higher and sent a bullet exploding straight into Bryne's face.

The gaunt man moved like lightning.

He must have had his farther hand on a gun for some seconds now, because the two explosions came almost as one. In the same instant he sent his chair clattering backward as he sprang to his feet.

He moved too fast. His aim was faulty because of his speed. The bullet whined past Fenton's ear and smacked into the pillar behind him. Fenton's shot struck Bryne an invisible blow in the shoulder that spun

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him half around, knocked him three-quarters off his feet. He scrambled desperately backward to regain his balance. His foot caught in a tangle of ripped-up wiring beside the water bath, and he went over backward in slow motion, his pale stare fixed with a strange illusion of calmness on Fenton's face as he fell.

For an instant he tottered on the brink of the bath. Then Torren chuckled a vast, deep, terrible chuckle and with tremendous effort lifted a hand far enough to seize Bryne by the wrist.

Still expressionless, still with that pale, intent stare fixed upon Fenton, Bryne went backward into the tank. There was a surge of heaving water. Bryne's suddenly convulsed limbs splashed a blinding spray and his hand groped out of nowhere for Torren's throat.

Fenton found himself running, without intending to or—he knew—needing to run. It was pure impulse to finish a job that needed finishing, though it was in better hands than his, now. He put his good hand on the rim of the huge tank, the revolver still gripped in it, leaning forward—

Bryne vanished under the oily, opaque surface. The incalculable weight of Torren's arm was like a millstone pressing him down, merciless, insensate as stone. After a while the thick, slow bubbles began to rise.

Fenton did not even see the motion Torren made. But when he

tried to spring backward, it was too late. A vast, cold, slippery hand closed like iron over his. They wrestled unequally for several slow seconds. Then Torren's grip relaxed and Fenton stumbled back, wringing his half-crushed fingers, seeing his revolver all but swallowed up in Torren's enormous grasp.

Torren grinned at him.

Slowly, reluctantly, Fenton grinded back.

"You knew he was lying," Torren said. "About the bombs."

"Yes, I knew."

"So it's all settled, then," Torren said. "No more quarreling, eh, son? You've come back." But he still held the revolver watchfully, his eyes alert.

Fenton shook his head.

"Oh, no. I came back, yes. I don't know why. I don't owe you a thing. But when the bombs fell I knew you were in trouble. I knew he'd never dare bomb me in sight of the 'visor screens as long as you had any power on Ganymede. I had to find out what was happening. I'll go, now."

Torren hefted the revolver thoughtfully. "Back to your Ganymedans?" he asked. "Ben, my boy, I brought you up a fool. Be reasonable! What can you do for them? How can you fight me?" He rumbled with a sudden deep chuckle. "Bryne thought I was helpless! Step over there, Ben. Switch on the 'visor."

Watching him carefully, Fenton obeyed. The snowy hills outside

sprang into view. Far off above them, tiny specks upon the blue-lit clouds, a formation of planes was just visible, humming nearer.

"About ten minutes more at the outside, I'd say," Torren estimated. "There are a lot of things about this set-up nobody even guesses except me. I wonder if Bryne really imagined I hadn't thought of every possibility. I allowed for this years and years ago. When my regular signals stopped going out an alarm went off—out there." The huge head nodded. "My guards would have got here in another ten minutes whether you came or not. Still, son, I'm obliged. You spared me that much time of feeling—helpless. You know how I hate it. Bryne could have killed me, but he could never have held me helpless very long. I owe you something, Ben. I don't like being obligated. Within reason, I'm willing to give you—"

"Nothing I want," Fenton cut in. "Only freedom for the Ganymedans, and that I'll have to take. You won't give it. I can take it, Torren. I think I know the way, now. I'm going back to them, Torren."

The huge hand floating at the surface of the water turned the pistol toward Fenton.

"Maybe you are, son. Maybe not. I haven't decided yet. Want to tell me just how you plan to stop me on Ganymede?"

"There's only one way," Fenton regarded the pistol with a grim smile. "I can't fight you. I haven't any

money or any influence. Nobody on Ganymede has except you. But the Ganymedans can fight you, Torren. I'll teach them. I learned guerilla warfare in a hard school. I know all there is to know about fighting against odds. Go on and put your new towers up, Torren. But—try and keep them up! We'll blow them apart as fast as you can put them together. You can bomb us, but you can't kill us all—not soon enough, you can't."

"Not soon enough—for what?" Torren demanded, the small eyes burning upon Fenton's. "Who's going to stop me, son? I've got all the time there is. Ganymede belongs to me!"

Fenton laughed, almost lightly.

"Oh, no it doesn't. You lease it. But Ganymede belongs to the solar system. It belongs to the worlds and the people of the worlds. It belongs to your own people, Torren—the Thresholders who are going to inherit the planets. You can't keep the news of what's happening quiet here on Ganymede. The Earth government owns the towers. When we blow them over the government will step in to find out what goes on. The scandal will get out, Torren. You can't keep it quiet!"

"Nobody will care," Torren grunted. But there was a new, strange, almost hopeful flint in his eyes. "Nobody's going to war over a little satellite like Ganymede. Nobody has any stake here but me. Don't be childish, Ben. People don't start wars over an ideal."

"It's more than an ideal with the Thresholders," Fenton said. "It's their lives. It's their future. And they're the people with power, Torren—not the Earth-bred men like me. The Thresholders are the future of the human race, and they know it, and Earth knows it. The new race on Mars with the three-yard chest expansions, and the new people on Venus with gills and fins may not look much like the Ganymedans, but they're the same species, Torren. They'll go to war for the Ganymedans if they have to. It's their own hides at stake. Ideals don't come into it. It's survival, for the Thresholders. Attack one world and you attack all worlds where Thresholders live. No man's an island, Torren—not even you."

Torren's breath came heavily in his tremendous chest.

"Not even me, Ben?"

Fenton laughed and stepped backward toward the open pillar. On the screen the planes were larger now, nearer and louder.

"Do you know why I was so sure you hadn't ordered those bombs to kill me?" he asked, reaching with his good hand for the open door. "For the same reason you won't shoot me now. You're crazy, Torren. You know you're crazy. You're two men, not one. And the other man is me. You hate society because of the debt it owes you. Half of you hates all men, and the Ganymedans most of all, because they're big like you, but they can walk like men. Their experiment worked and yours failed.

So you hate them. You'll destroy them if you can."

He found the door, pushed it open wide. On the threshold he said:

"You didn't adopt me on a whim, Torren. Part of your mind knew exactly what it was doing. You brought me up the hard way. My life was spent in a symbolic Centrifuge, just like yours. I am you. I'm the half that doesn't hate the Ganymedans at all. I'm the half that knows they're your people, the children you might have had, walking a free world as yours would have walked if your experiment had come out right, like theirs. I'll fight for them, Torren. In a respirator and mask, but I'll fight. That's why you'll never kill me."

Sighing, Torren tilted the pistol. His thick finger squeezed itself inside the guard, began slowly to tighten upon the trigger. Slowly,

"Sorry, son," he said, "but I can't let you get away with it."

Fenton smiled. "I said you were crazy. You won't kill me, Torren. There's been a fight going on inside you ever since you left the Centrifuge—until now. Now it's going on outside, in the open. That's a better place. As long as I'm alive, I'm your enemy and yourself. Keep it on the outside, Torren, or you will go mad. As long as I'm alive I'll fight you. But as long as I'm alive, you're not an island. It's your battle I'm fighting. You'll do your best to defeat me, Torren, but you won't kill me. You won't dare."

He stepped back into the pillar,

reached for the spring to close the door. His eyes met Torren's confidently.

Torren's teeth showed under grimacing lips.

"You know how I hate you, Ben," he said in a thick, fierce voice. "You've always known!"

"I know," Fenton said, and touched the spring. The door slid shut before him. He was gone.

Torren emptied the revolver with a sort of wild deliberation at the unmarred surface of the pillar, watching the bullets strike and ricochet off it one by one until the hall was full of their whining and the loud explosions of the gun. The pillar stood

blank and impervious where Fenton's face had been.

When the last echo struck the ceiling Torren dropped the gun and fell back into his enormous tank, caught his breath and laughed, tentatively at first and then with increasing volume until great billows of sound rolled up the walls and poured between the pillars toward the stars. Enormous hands flailed the water, sending spray high. The vast bulk swallowed monstrously, convulsed and helpless with its laughter.

On the screen the roar of the coming planes grew until their noise swallowed up even Torren's roaring mirth.

THE END

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INTERPLANETARY BALLOONS

(Continued from page 4)

coming the ship's inertia—but that inertia would be inefficiently high. Even if human beings could happily endure 15-G accelerations, the ship's structural members would have to be built to take it too—enormously rigid, sturdy frames and bedplates anchoring the rocket engine. Fuel tanks braced to stand the terrible "weight" of the fuel under such acceleration. Every part of the ship would have to be made immensely massive—that is, heavy. So we have inefficiency because the structure is heavier than it should be. That looks like a bad answer.

There's another source of inefficiency in operating a regular run from Earth to Mars and back, for instance. The passengers have to have physical comforts on the long trip—beds, bunks, or something of the sort, laundry and bath arrangements, chairs and such. They'll need air-refreshing green plants in hydroponic tanks. A lot of massive—and, therefore, fuel-consuming—equipment. Of course, for a short hop of a matter of five to ten hours, tanked air, and a minimum of physical-comfort equipment would do.

Perhaps the most efficient answer would be to use two vastly different types of ships. One would be small, compact short-trip ships with a maximum acceleration capability of about 5-G—barren little jobs with the level of comfort found in a commuting train coach. These sturdy little ships make the hop from Earth's sur-

face to about fifty thousand miles out, where the balloon-ships orbit.

The real interplanetary ships would be big titanium-alloy balloons. Their light, weak structure would be unable to stand any acceleration greater than about $\frac{1}{2}$ -G, although their spherical shape makes them enormously strong so far as bursting strain is concerned. They never come near a planet, and don't have to be strong against crushing weight. Their light structure is easy to accelerate; at fifty thousand miles Earth's gravity is so tenuous that slow acceleration is practical. The problem of lifting heavy masses of human-comfort equipment in and out of Earth's gravity field is practically eliminated. Ships would be markedly more efficient in space if spherical design were used, because that gives maximum volume of ship for minimum weight of structural members—and hence requires minimum mass of vehicle per ton of pay-load.

Naturally, the system of balloon-ships for interplanetary jaunts won't be the first method used; such ships require that a space-station be established first—a dockyard in space for building and repairing the ship, able to act as the base of operations. This base itself must, naturally, be constructed by men working from the smaller ferry-ships. The first ships to Mars and Venus won't be balloon ships—but if any degree of interplanetary traffic, either freight or human, develops, the balloon ship will have its place!

The Editor.



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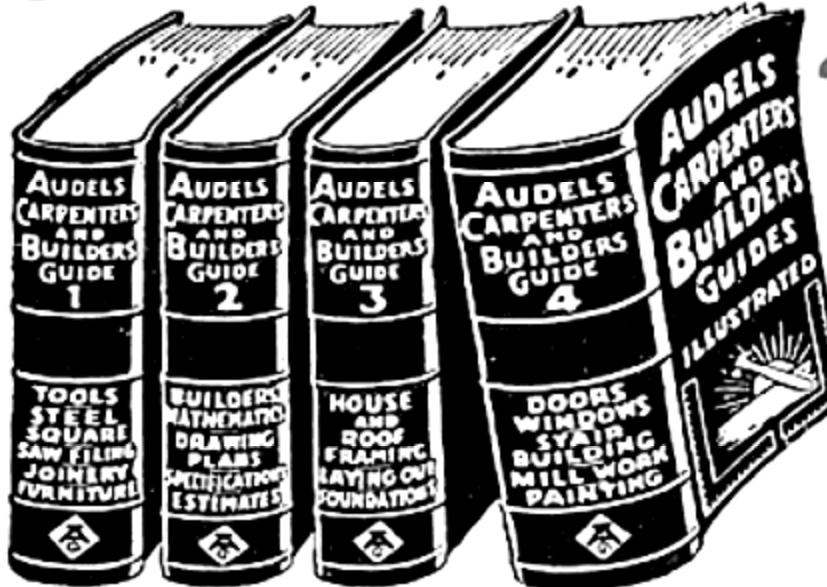
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